- Place the membrane/electrode in an oven at 100°-170°
 for 10-60 minutes.
- F. For Carbon/Ru Oxide Electrode application drying, the following steps are taken:

Repeat step A on the opposite side of the membrane.

- G. For acidification, the following steps are taken:
 - For Ion-Exchange, soak membrane/electrodes in lightly boiling dilute MH2S04 solution for 1-3 hours.
 - For cleaning, rinse the membrane/electrodes in deionized water;
 - For drying, dry the membrane/electrodes in air, or air dry then desiccate overnight, or place in a 30°-50° C. oven for 1-3 hours before cutting to the final dimensions.

The present invention may be embodied in other specific 15 forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrated and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

What is claimed and desired to be secured by United States Letters Patent is:

- 1. An electrochemical gas sensor for quantitative measurement of a gas in an ambient atmosphere comprising:
 - a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material;
 - a porous mixed ionic-electronic conductive counter electrode having both an electronic conducting material and an ionic conducting material;
 - a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm;
 - the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode;

means for electrical measurement;

- said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means;
- whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.
- 2. The electrochemical gas sensor as defined in claim 1, further comprising:
 - means for applying DC power across the protonic conductive electrolyte membrane;
 - an electrical connection between the sensing electrode, the counter electrode, and the means for applying DC power across the protonic conductive electrolyte membrane; and
 - switch means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane;

whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes.

3. The electrochemical gas sensor as defined in claim 1, 65 wherein said sensing and counter electrodes comprise carbon.

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- The electrochemical gas sensor as defined in claim 1, wherein said sensing and counter electrodes comprise noble metals.
- The electrochemical gas sensor as defined in claim 1, wherein said sensing and counter electrodes comprise conductive metal oxides.
- 6. The electrochemical gas sensor as defined in claim 1, wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer.
- 7. The electrochemical gas sensor as defined in claim 1, wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane.
- 8. The electrochemical gas sensor as defined in claim 1, wherein the electrochemical gas sensor is adapted to detect CO.
- 9. The electrochemical gas sensor as defined in claim 1, wherein the electrochemical gas sensor is adapted to detect NO...
- 10. The electrochemical gas sensor as defined in claim 1, wherein the electrochemical gas sensor is adapted to detect hydrogen.
- 11. The electrochemical gas sensor as defined in claim 1, wherein the electrochemical gas sensor is adapted to detect HoS.
- 12. The electrochemical gas sensor as defined in claim 1, wherein the electrochemical gas sensor is adapted to detect H₂O vapor.
- 13. The electrochemical gas sensor as defined in claim 1, wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm.
- 14. The electrochemical gas sensor as defined in claim 1, wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials.
- 15. The electrochemical gas sensor as defined in claim 14, wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluor-ethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group.

16. The electrochemical gas sensor as defined in claim 14, wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum.

- 17. The electrochemical gas sensor as defined in claim 14, wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide.
- 18. The electrochemical gas sensor as defined in claim 1, wherein the electrochemical gas sensor further comprises:
- first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane;

means for applying a DC power across the membrane;

said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane;

whereby the gas is transported away from the counter electrode when said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes.

19. The electrochemical gas sensor of claim 18, wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon.

20. The electrochemical gas sensor as defined in claim 18, wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals.

21. The electrochemical gas sensor as defined in claim 18, wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides.

22. The electrochemical gas sensor as defined in claim 18, wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm.

23. The electrochemical gas sensor as defined in claim 18, wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron 20 mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials.

24. The electrochemical gas sensor as defined in claim 23, wherein the proton conductor material for both the first and 25 second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group.

25. The electrochemical gas sensor as defined in claim 23, 30 wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum.

26. The electrochemical gas sensor as defined in claim 23, wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 40 to 50 wt% of Ru oxide.

. 27. The electrochemical gas sensor as defined in claim 1, wherein the electrochemical gas sensor further comprises:

a second protonic conductive electrolyte membrane;

first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane;

means for applying a DC power across said second protonic electrolyte membrane;

said first and second pump electrodes having in electrical 55 connection therebetween said means for applying DC power across said second protonic electrolyte membrane;

whereby the gas is transported away from the counter electrode when said means for applying DC power 60 across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes.

28. The electrochemical gas sensor as defined in claim 27, wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer.

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29. The electrochemical gas sensor as defined in claim 27, wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane.

30. An electrochemical gas sensor for quantitative measurement of a gas in an ambient atmosphere comprising:

a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material;

a porous mixed ionic-electronic conductive counter electrode having both an electronic conducting material and an ionic conducting material;

a protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes;

the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode;

means for electrical measurement;

said sensing and counter electrodes having electrically connected therebetween said means for electrical measurement;

means for applying a DC pulse power source across the membrane:

said sensing and counter electrodes having in electrical connection therebetween said means for applying DC pulse power across the membrane; and

switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the means for applying a DC pulse power source across the membrane;

whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic when said switch means connects said electrical measurement means to the sensing and counter electrodes; and

whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane to the sensing and counter electrodes.

31. The electrochemical gas sensor as defined in claim 30, wherein said sensing and counter electrodes comprise carbon.

32. The electrochemical gas sensor as defined in claim 30, wherein said sensing and counter electrodes comprise noble metals.

33. The electrochemical gas sensor as defined in claim 30, wherein said sensing and counter electrodes comprise conductive metal oxides.

34. The electrochemical gas sensor as defined in claim 30, wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer.

35. The electrochemical gas sensor as defined in claim 30, wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane.

36. The electrochemical gas sensor as defined in claim 30, wherein the electrochemical gas sensor is adapted to detect CO.

37. The electrochemical gas sensor as defined in claim 30, wherein the electrochemical gas sensor is adapted to detect hydrogen.

38. The electrochemical gas sensor as defined in claim 30, wherein the electrochemical gas sensor is adapted to detect H₂S.

- 39. The electrochemical gas sensor as defined in claim 30, wherein the electrochemical gas sensor is adapted to detect H₂O vapor.
- 40. The electrochemical gas sensor as defined in claim 30, wherein the electrochemical gas sensor is adapted to detect 5 NO.
- 41. The electrochemical gas sensor as defined in claim 30, wherein the sensing and counter electrodes have a diameter in a range of 1 mm to 15 mm, and the protonic conductive electrolyte membrane has a thickness in a range of 0.1 mm-1 mm.
- 42. The electrochemical gas sensor as defined in claim 41, wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm.
- 43. The electrochemical gas sensor as defined in claim 30, wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10–50 wt% of a proton conductor material and 50–90 wt% of a first and a second electrical conductor materials.
- 44. The electrochemical gas sensor as defined in claim 43, wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluor-ethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group.
- 45. The electrochemical gas sensor as defined in claim 43, wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum.
- 46. The electrochemical gas sensor as defined in claim 43, wherein one of the first and second electrical conductor materials for the counter electrode is 50–99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1–50 wt% of Ru oxide.
- 47. An electrochemical gas sensor for quantitative measurement of a gas in an ambient atmosphere comprising:
 - a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material and being exposed to the ambient atmosphere;
 - a porous mixed ionic-conductive counter electrode having both an electronic conducting material and an ionic conducting material;
 - a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter 50 electrodes;
 - the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode;
 - a second protonic conductive electrolyte membrane;
 - first and second porous mixed ionic-electronic conductive pump electrodes, each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane;
 - said first porous pump electrode being exposed to a chamber sealed off from the ambient atmosphere;
 - said second porous pump electrode being separated from said counter electrode by a perforated support structure

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- composed of an electrical conducting material, both said second porous pump electrode and said counter electrode being in contact with said perforated support structure:
- means for electrical measurement in electrical contact with said sensing electrode and perforated support structure:
- means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said first pump electrode and said perforated support structure:
- whereby the gas is transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane; and
- whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.
- 48. The electrochemical gas sensor as defined in claim 47, wherein the sensing and counter electrodes have a diameter in a range of 1 mm-15 mm, and the protonic conductive electrolyte membrane has a thickness in a range of 0.1 mm-1 mm.
- 49. The electrochemical gas sensor as defined in claim 48, wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm.
- 50. The electrochemical gas sensor as defined in claim 47, wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials.
- 51. The electrochemical gas sensor as defined in claim 50, wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluor-ethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group.
- 52. The electrochemical gas sensor as defined in claim 50, wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum.
- 53. The electrochemical gas sensor as defined in claim 50, wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide.
- 54. The electrochemical gas sensor as defined in claim 47, wherein the electrochemical gas sensor is adapted to detect55 CO.
 - 55. The electrochemical gas sensor as defined in claim 47, wherein the electrochemical gas sensor is adapted to detect hydrogen.
 - 56. The electrochemical gas sensor as defined in claim 47, wherein the electrochemical gas sensor is adapted to detect NO_x.
 - 57. The electrochemical gas sensor as defined in claim 47, wherein the electrochemical gas sensor is adapted to detect H_2O vapor.
 - 58. The electrochemical gas sensor as defined in claim 47, wherein the electrochemical gas sensor is adapted to detect H₂S.

- 59. An electrochemical gas sensor for quantitative measurement of a gas in an ambient atmosphere comprising:
 - a porous mixed ionic-electronic conductive sensing electrode having both an electronic conducting material and an ionic conducting material and being exposed to the ambient atmosphere;
 - a porous mixed ionic-electronic conductive reference electrode having both an electronic conducting material and an ionic conducting material;
 - a porous mixed ionic-conductive counter electrode having both an electrical conducting material and an ionic conducting material, and being separate from both said sensing and reference electrodes;
 - a protonic conductive electrolyte membrane, having top and bottom sides, said top side of said protonic conductive membrane being in contact with the counter electrode and the reference electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode;
 - the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode;
 - means for electrical measurement in electrical contact between the sensing electrode and the counter electrode;
 - means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode and said reference electrode;
 - whereby the gas is transported away from the reference electrode when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane; and
 - whereby, in a positive ambient concentration of said gas, 35 said electrical measurement means detects changes in said electrical characteristic.
- 60. The electrochemical gas sensor as defined in claim 59, wherein said sensing, count and reference electrodes comprise carbon.
- 61. The electrochemical gas sensor as defined in claim 59, wherein said sensing, count and reference electrodes comprise noble metals.
- 62. The electrochemical gas sensor as defined in claim 59, wherein said sensing, counter and reference electrodes comprise conductive metal oxides.
- 63. The electrochemical gas sensor as defined in claim 59, wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer.
- 64. The electrochemical gas sensor as defined in claim 59, wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane.
- 65. The electrochemical gas sensor as defined in claim 59, wherein the electrochemical gas sensor is adapted to detect 55
- 66. The electrochemical gas sensor as defined in claim 59, wherein the electrochemical gas sensor is adapted to detect NO...
- 67. The electrochemical gas sensor as defined in claim 59, wherein the electrochemical gas sensor is adapted to detect hydrogen.

- 68. The electrochemical gas sensor as defined in claim 59, wherein the electrochemical gas sensor is adapted to detect H_2S .
- 69. The electrochemical gas sensor as defined in claim 59, wherein the electrochemical gas sensor is adapted to detect H₂O vapor.
- 70. The electrochemical gas sensor as defined in claim 59, wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm.
- 71. The electrochemical gas sensor as defined in claim 59, wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials.
- 72. The electrochemical gas sensor as defined in claim 71, wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group.
- 73. The electrochemical gas sensor as defined in claim 71, wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum.
- 74. The electrochemical gas sensor as defined in claim 71, wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide.
- 75. The electrochemical gas sensor as defined in claim 1, wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes.
- 76. The electrochemical gas sensor as defined in claim 30, wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes.
- 77. The electrochemical gas sensor as defined in claim 47, wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping electrodes.
- 78. The electrochemical gas sensor as defined in claim 59, wherein the sensing, counter, and reference electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, and reference electrodes.

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Differences in the Claim Language	Unlike original patent claim 1, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 2, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 2, presented reissue claim 79 does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical connection between the sensing electrode, the counter electrode, and the means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes."	Unlike original patent claim 3, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 3, presented reissue claim 79 does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 4, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 4, presented reissue claim 79 does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	79	79		79	79
Original Patent Claim	1	2		E	4

Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 5, presented reissue claim 79 recites the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 6, presented reissue claim 79 does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	79		79	
Original Patent Claim	\$		9	

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Differences in the Claim Language	Unlike original patent claim 7, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 7, presented reissue claim 79 does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	79		79	
Original Patent Claim	7		∞	

Differences in the Claim Language	Unlike original patent claim 9, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 9, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 10, presented reissue claim 79 recites the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	79		79	
Original Patent Claim	6		10	

Differences in the Claim Language	Unlike original patent claim 11, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 11, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 12, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	79		79	
Original Patent Claim	11		12	

Differences in the Claim Language	Unlike original patent claim 13, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 13, presented reissue claim 79 does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 14, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 14, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
Presented Reissue Claim	79		79	
Original Patent Claim	13		14	

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Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 15, presented reissue claim 79 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 16, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	79		79	
Original Patent Claim	15		16	

nted Differences in the Claim Language Claim	Unlike original patent claim 17, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 17, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 18, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across the membrane applies a DC power to the first and second pump
Presented Reissue Claim	79		79	
Original Patent Claim	17		18	·

nted Differences in the Claim Language Claim	Unlike original patent claim 19, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 19, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 20, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented Reissue Claim	79		79	
Original Patent Claim	19		20	

Differences in the Claim Language	Unlike original patent claim 21, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 21, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 22, presented reissue claim 79 does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	79		79	
Original Patent Claim	21		22	

Differences in the Claim Language	Unlike original patent claim 23, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 23, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a protonelectron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 79 recites the language "a two-electrode electrodemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 24, presented reissue claim 79 does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	79		79	
Original Patent Claim	23		24	

nted Differences in the Claim Language Claim	Unlike original patent claim 25, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 25, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 26, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim	79		79	
Original Patent Claim	25		26	

Differences in the Claim Language	Unlike original patent claim 27, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 27, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes.	Unlike original patent claim 28, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 28, presented reissue claim 79 does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	79		79
Original Patent Claim	27		28

Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 29, presented reissue claim 79 does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 30, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 30, presented reissue claim 79 does not recite the language "said sensing and counter electrodes having electrically connected therebetween said means for electrical measurement; means for applying a DC pulse power source across the membrane; and switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the means for applying a DC pulse power source across the membrane; when said switch means connects said electrical measurement means to the sensing and counter electrodes; and whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane to the sensing and counter electrodes."
Presented Reissue Claim	62		79	
Original Patent Claim	29		30	

nted Differences in the Claim Language Claim	Unlike original patent claim 31, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 31, presented reissue claim 79 does not recite the language "wherein said sensing and counter electrodes comprise carbon."	
Presented Reissue Claim	79	79
Original Patent Claim	31	32

Unlike original patent claim 33, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recite she language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrode being the only two electrodes in contact with the first protonic conductive electrode being the only two sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 33, presented reissue claim 79 does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides." Unlike original patent claim 34, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrody membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrodes and having a diameter in the range of approximately 1 mm to 15 mm, and being electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrodes each having a diameter in the range of approximately ion-conductive electrolyte membrane and an orductive electrolyte membrane and an orductive electrodes	Original	Presented	Differences in the Claim Language
79	ratent Ciann	Reissue Claim	
79	33	79	Unlike original patent claim 33, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor." recites the language "a first protonic conductive electrolyte membrane
42			in between and in contact with the sensing and counter electrodes, and having a thickness in the range
79			of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two
79			electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the
79			language "said sensing and counter electrodes each having a diameter in the range of approximately 1
79			mm to 15 mm, and being electrically connected to said electrical measurement means."
79			Unlike original patent claim 33, presented reissue claim 79 does not recite the language "wherein said
79			sensing and counter electrodes comprise conductive metal oxides."
electrochemical gas sensor," recites the language "a first protonic conductive electrolyte me in between and in contact with the sensing and counter electrodes, and having a thickness in the of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the celectrodes in contact with the first protonic conductive electrolyte membrane" and also reclampage "said sensing and counter electrodes each having a diameter in the range of approximant to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 33, presented reissue claim 79 does not recite the language "whe protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinal exchange polymer."	34	42	Unlike original patent claim 34, presented reissue claim 79 recites the language "a two-electrode
in between and in contact with the sensing and counter electrodes, and having a thickness in the of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the celectrodes in contact with the first protonic conductive electrolyte membrane, and also real language "said sensing and counter electrodes each having a diameter in the range of approximant to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 33, presented reissue claim 79 does not recite the language "wheeprotonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinal exchange polymer."			electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane
of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the celectrodes in contact with the first protonic conductive electrolyte membrane" and also reclange "said sensing and counter electrodes each having a diameter in the range of approximm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 33, presented reissue claim 79 does not recite the language "whe protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinal exchange polymer."			in between and in contact with the sensing and counter electrodes, and having a thickness in the range
electrodes in contact with the first protonic conductive electrolyte membrane" and also reclanguage "said sensing and counter electrodes each having a diameter in the range of approximm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 33, presented reissue claim 79 does not recite the language "whe protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinal exchange polymer."			of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two
language "said sensing and counter electrodes each having a diameter in the range of approxin mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 33, presented reissue claim 79 does not recite the language "whe protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinal exchange polymer."			electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the
mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 33, presented reissue claim 79 does not recite the language "whe protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinal exchange polymer."			language "said sensing and counter electrodes each having a diameter in the range of approximately 1
Unlike original patent claim 33, presented reissue claim 79 does not recite the language "wheeprotonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinal exchange polymer."			mm to 15 mm, and being electrically connected to said electrical measurement means."
Unlike original patent claim 33, presented reissue claim 79 does not recite the language "whe protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinal exchange polymer."			
protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinal exchange polymer."			Unlike original patent claim 33, presented reissue claim 79 does not recite the language "wherein the
exchange polymer."			protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-
			exchange polymer."

inted Differences in the Claim Language Claim	Unlike original patent claim 35, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 35, presented reissue claim 79 does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 36, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 36, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect O."
Presented Reissue Claim		79
Original Patent Claim	35	36

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
37	79	Unlike original patent claim 37, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 37, presented reissue claim 79 does not recite the language "rein the electrochemical gas sensor is adapted to detect hydrogen."
38	79	Unlike original patent claim 38, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 38, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."

Differences in the Claim Language	Unlike original patent claim 39, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 39, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."	Unlike original patent claim 40, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 40, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
Presented Reissue Claim	79		79
Original Patent Claim	39		40

Differences in the Claim Language	Unlike original patent claim 41, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," and also recites the language the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	U Unlike original patent claim 42, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," and also recites the language the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 40, presented reissue claim 79 does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	79	79
Original Patent Claim	41	42

Original Patent Claim 45	Presented Reissue Claim 79	Unlike original patent claim 45, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 45, presented reissue claim 79 does not recite the language "wherein one black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
46	79	Unlike original patent claim 46, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 46, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
47	79	Unlike original patent claim 47, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 47, presented reissue claim 79 does not recite the language "a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes, each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to a chamber sealed off from the ambient atmosphere; said second porous pump electrode being separated from said counter electrode by a perforated support structure composed of an electrical conducting material, both said second porous pump electrode and said counter electrode being in contact with said sensing electrode support structure; means for electrical measurement in electrical contact with said sensing electrode and perforated support structure; whereby the gas is transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies and positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic

Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 49, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor" and recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 49, presented reissue claim 79 does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	97	79
Original Patent Claim	48	49

ed Differences in the Claim Language	Unlike original patent claim 50, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 50, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 51, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 51, presented reissue claim 79 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim		62
Original Patent Claim	90	51

Differences in the Claim Language		Unlike original patent claim 52, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 52, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 53, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 53, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."
Presented	Reissue Claim	6L	79
Original	Patent Claim	52	53

Differences in the Claim Language	Unlike original patent claim 54, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	electrochemical gas sensor is adapted to detect CO."	Unlike original patent claim 55, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 55, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	79		61
Original Patent Claim	54		55

ed Differences in the Claim Language	Unlike original patent claim 56, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 56, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 57, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 57, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	79		
Original Patent Claim	56		57

Differences in the Claim Language	Unlike original patent claim 58, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 58, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 59, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 59, presented reissue claim 79 does not recite the language "a porous mixed ionic-electronic conductive reference electrode having both an electronic conducting material and an ionic conducting material" and does not recite the language "a protonic conductive electrolyte membrane, having top and bottom sides, said top side of said protonic conductive membrane being in contact with the counter electrode and the reference electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode; the sensing electrode, means for electrical measurement in electrical characteristic between the sensing electrode, and the counter electrode; means for electrical measurement in electrical contact between the sensing electrode when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies and a protonic electrolyte membrane applies a DC pow
Presented Reissue Claim	79	79
Original Patent Claim	58	59

Ited Differences in the Claim Language Claim	Unlike original patent claim 60, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 60, presented reissue claim 79 does not recite the language "wherein said sensing, count and reference electrodes comprise carbon."	
Presented Reissue Claim	79		79
Original Patent Claim	09		61

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
62	79	Unlike original patent claim 62, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 62, presented reissue claim 79 does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."
63	79	Unlike original patent claim 63, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 63, presented reissue claim 79 does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ionexchange polymer."

Differences in the Claim Language	Unlike original patent claim 66, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 66, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 67, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 67, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	79		79
Original Patent Claim	99		

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Presented Differences in the Claim Language	ш	Unlike original patent claim 68, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 68, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 69, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 69, presented reissue claim 79 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Original	Patent Claim	89		69

Differences in the Claim Language	Unlike original patent claim 70, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 70, presented reissue claim 79 does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 71, presented reissue claim 79 does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."
Presented Reissue Claim	61	
Original Patent Claim	70	71

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nted Differences in the Claim Language Claim	Unlike original patent claim 72, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 72, presented reissue claim 79 does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer broton conductor material for both the sensing, counter and reference electrodes is a copolymer.	
Presented Reissue Claim	79	79
Original Patent Claim	72	73

ed Differences in the Claim Language	Unlike original patent claim 74, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 74, presented reissue claim 79 does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide."	Unlike original patent claim 75, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 75, presented reissue claim 79 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."
Presented Reissue Claim	79		79
Original Patent Claim	74		7.5

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
92	62	Unlike original patent claim 76, presented reissue claim 79 recites the language "a two-electrode
		electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range
		of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two
		electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the
		language "said sensing and counter electrodes each having a diameter in the range of approximately 1
		mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike, original patent claim 76, presented reissue claim 79 does not recite the language "wherein the
		sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic
		and electronic conducting materials are continuous from the first side to the opposite second side
		within each of the sensing and counter electrodes."
77	79	Unlike original patent claim 77, presented reissue claim 79 recites the language "a two-electrode
		electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in
		between and in contact with the sensing and counter electrodes, and having a thickness in the range
		of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two
		electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the
		language "said sensing and counter electrodes each having a diameter in the range of approximately 1
		mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 77, presented reissue claim 79 does not recite the language "wherein the
		sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a
		side to the opposite second side within each of the sensing, counter, first pumping, and second minimal electrodes."

Differences in the Claim Language	Unlike original patent claim 78, presented reissue claim 79 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 78, presented reissue claim 79 does not recite the language "wherein the sensing, counter, and reference electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, and reference electrodes."
Original Presented Patent Claim Reissue Claim	79	
Original Patent Claim	78	

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Differences in the Claim Language	Unlike original patent claim 1, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 2, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 2, presented reissue claim 80 does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical connection between the sensing electrode, the counter electrode, and the means for alternating an electrical measurement the protonic conductive electrolyte membrane; and switch means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes."
Presented Reissue Claim	08	08
Original Patent Claim	1	2

Differences in the Claim Language	Unlike original patent claim 3, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 3, presented reissue claim 80 does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 4, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 4, presented reissue claim 80 does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	80		80	
Original Patent Claim	E		4	

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Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 5, presented reissue claim 80 does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 6, presented reissue claim 80 does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	08		80	
Original Patent Claim	\$		9	

Differences in the Claim Language	Unlike original patent claim 7, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 7, presented reissue claim 80 does not recite the language" wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 8, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	08		08	
Original Patent Claim	7		8	

Differences in the Claim Language	Unlike original patent claim 9, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 9, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 10, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	08		08	
Original Patent Claim	6		10	

Differences in the Claim Language	Unlike original patent claim 11, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original natent claim 11 presented reissue claim 80 does not recite the language "wherein the	electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 12, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	08		08	
Original Patent Claim	11		12	

Differences in the Claim Language	Unlike original patent claim 13, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 13, presented reissue claim 80 does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 14, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 14, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
Presented Reissue Claim	08		08	
Original Patent Claim	13		14	

Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 15, presented reissue claim 80 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 16, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	80		08	
Original Patent Claim	15		16	

Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 17, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 18, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes."
Presented Reissue Claim	08	80
Original Patent Claim	17	18

Differences in the Claim Language	Unlike original patent claim 19, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 19, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 20, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented Reissue Claim	08		80	
Original Patent Claim	19		20	

Differences in the Claim Language	Unlike original patent claim 21, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 21, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 22, presented reissue claim 80 does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	80		08	
Original Patent Claim	21		22	

Differences in the Claim Language	Unlike original patent claim 23, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 23, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a protonelectron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 24, presented reissue claim 80 does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	08		80	
Original Patent Claim	23		24	

Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 25, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 26, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim	08		08	
Original Patent Claim	25		26	

Differences in the Claim Language	Unlike original patent claim 27, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 27, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second norous mixed ionic-electronic conductive mump electrodes each having both an	electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across said second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes."	Unlike original patent claim 28, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 28, presented reissue claim 80 does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	08		08
Original Patent Claim	27		. 28

Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 29, presented reissue claim 80 does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 30, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrodes of an applied voltage to the sensing electrode. and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 30, presented reissue claim 80 does not recite the language "means for applying a DC pulse power across the membrane; and switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the means for applying a DC pulse power source across the membrane; whereby, in a positive ambient concentration of said gas, said electrical measurement means to the sensing and counter electrodes; and whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane to the sensing and counter electrodes."
Presented Reissue Claim	08		08
Original Patent Claim	29		30

Differences in the Claim Language	Unlike original patent claim 31, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 31, presented reissue claim 80 does not recite the language "wherein said	Unlike original patent claim 32, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode, and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 32, presented reissue claim 80 does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	08	08
Original Patent Claim	31	32

Inted Differences in the Claim Language Claim	Unlike original patent claim 33, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 33, presented reissue claim 80 does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 34, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 34, presented reissue claim 80 does not recite the language wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-
Presented Reissue Claim	08		08	
Original Patent Claim	33		34	

Differences in the Claim Language	Unlike original patent claim 35, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 35, presented reissue claim 80 does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 36, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 36, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	08		08
Original Patent Claim	35		36

Differences in the Claim Language	Unlike original patent claim 37, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	electrochemical gas sensor is adapted to detect hydrogen."	Unlike original patent claim 38, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 38, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
Presented Reissue Claim	08		08
Original Patent Claim	37		38

Differences in the Claim Language	Unlike original patent claim 39, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 39, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."	Unlike original patent claim 40, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 40, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
Presented Reissue Claim	08		08
Original Patent Claim	39		. 40

Differences in the Claim Language	Unlike original patent claim 41, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 42, presented reissue claim 80 recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 42, presented reissue claim 80 does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	08	08
Original Patent Claim	41	42

Differences in the Claim Language	Unlike original patent claim 45, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 45, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 46, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 46, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."
Presented Reissue Claim	08		08	·
Original Patent Claim	45		46	

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
47	08	Unlike original patent claim 47, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the
·		nanguage said sensing and counter electrodes each naving a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 47, presented reissue claim 80 does not recite the language "a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive
	-	pump electrodes, each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to a chamber sealed off from the ambient atmosphere; said second porous pump electrode being separated from said counter electrode by a perforated support structure composed of an electrical conducting material, both said
		second porous pump electrode and said counter electrode being in contact with said perforated support structure; means for electrical measurement in electrical contact with said sensing electrode and perforated support structure; means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said first pump electrode and said perforated support
		structure; whereby the gas is transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.

Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 80 recites the language "presented reissue claim 80 recites the language the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 49, presented reissue claim 80 recites the language "presented reissue claim 80 recites the language the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 49, presented reissue claim 80 does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	08	08	
Original Patent Claim	48	49	

Differences in the Claim Language	Unlike original patent claim 50, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 50, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 51, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 51, presented reissue claim 80 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	08	08
Original Patent Claim		51

Differences in the Claim Language	Unlike original patent claim 52, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 52, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 53, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 53, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."
Presented Reissue Claim	08		08	
Original Patent Claim	52		53	

e Claim	Unlike original patent claim 54, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 54, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."	Unlike original patent claim 55, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 55, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	08	•	8
Original Patent Claim	54		55

56 80 Unlike original Sonductive and having with the gas counter electrochen and to 15 m a	Differences in the Claim Language
08	Unlike original patent claim 56, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
08	Unlike original patent claim 56, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
and having with the ga counter ele language "s mm to 15 n Unlike orig electrochen	Unlike original patent claim 57, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 57, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

Differences in the Claim Language	Unlike original patent claim 58, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 58, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H.S."	Unlike original patent claim 59, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 59, presented reissue claim 80 does not recite the language "a protonic conductive electrolyte membrane, having top and bottom sides, said top side of said protonic conductive membrane being in contact with the sensing electrode; means for electrical measurement in electrical contact between the sensing electrode and the reference electrode; means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode and the reference electrode when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a BC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a BC power across said protonic electrolyte membrane and said electrose class said electrical electrolyte membrane, and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic."
Presented Reissue Claim	08	08
Original Patent Claim	28	

Differences in the Claim Language	Unlike original patent claim 60, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	sensing, count and reference electrodes comprise carbon."	Unlike original patent claim 61, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 61, presented reissue claim 80 does not recite the language "wherein said sensing, count and reference electrodes comprise noble metals."
Presented Reissue Claim	08		08
Original Patent Claim	09		

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
95	08	Unlike original patent claim 62, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 62, presented reissue claim 80 does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."
	08	Unlike original patent claim 63, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 63, presented reissue claim 80 does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ionexchange polymer."

Differences in the Claim Language	Unlike original patent claim 64, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 64, presented reissue claim 80 does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 65, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 65, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	08	08
Original Patent Claim	64	65

Differences in the Claim Language	Unlike original patent claim 68, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 68, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 69, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 69, presented reissue claim 80 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	08		· ·
Original Patent Claim	89		69

Differences in the Claim Language	Unlike original patent claim 70, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 70, presented reissue claim 80 does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 71, presented reissue claim 80 does not recite the language "wherein the electronic and ionic conductive materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."
Presented Reissue Claim			08
Original Patent Claim	70		7.1

Original Patent Claim 72	Presented Reissue Claim 80	Unlike original patent claim 72, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 72, presented reissue claim 80 does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
73	08	Unlike original patent claim 73, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode, and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 73, presented reissue claim 80 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."

Differences in the Claim Language	Unlike original patent claim 76, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 76, presented reissue claim 80 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."	Unlike original patent claim 77, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode, and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 77, presented reissue claim 80 does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping electrodes."
Presented Reissue Claim	08	08
Original Patent Claim	76	77

Ited Differences in the Claim Language Claim	Unlike original patent claim 78, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 78, presented reissue claim 80 does not recite the language "wherein the sensing, counter, and reference electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, and reference electrodes."
Presented Reissue Clai	80	
Original Presented Patent Claim Reissue Claim	78	

Differences in the Claim Language	Unlike original patent claim 1, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 2, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 2, presented reissue claim 81 does not recite the language "means for applying DC power across the protonic conductive electrode, and the means for applying DC power across the protonic conductive electrolyte membrane; and switch means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes."
Presented Reissue Claim	81	
Original Patent Claim	_	2

Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 5, presented reissue claim 81 does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 6, presented reissue claim 81 does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ionexchange polymer."
Presented Reissue Claim	81	81
Original Patent Claim	5	9

Original Patent Claim 9	Presented Reissue Claim 81	Unlike original patent claim 9, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 9, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
10	8	Unlike original patent claim 10, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 10, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."

ed Differences in the Claim Language	Unlike original patent claim 11, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 11, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 12, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	81	81
Original Patent Claim	-	12

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
13	81	Unlike original patent claim 13, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 13, presented reissue claim 81 does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
14	81	Unlike original patent claim 14, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 14, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."

Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 15, presented reissue claim 81 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 16, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	81		8	
Original Patent Claim	15		16	

Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 17, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 18, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes."
Presented Reissue Claim	81	81
Original Patent Claim	17	18

Differences in the Claim Language	Unlike original patent claim 19, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 19, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 20, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented Reissue Claim	81		81	
Original Patent Claim	61		20	

Differences in the Claim Language	Unlike original patent claim 21, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 21, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 22, presented reissue claim 81 does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim				
Original Patent Claim	21		22	

Differences in the Claim Language	Unlike original patent claim 23, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 23, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a protonelectron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 24, presented reissue claim 81 does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	81		. 81	
Original Patent Claim	23		24	

Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 25, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 26, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim	81		18	
Original Patent Claim	25		26	

iented Differences in the Claim Language le Claim	Unlike original patent claim 27, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 27, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane; said first and second protonic electrolyte membrane applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes."	
Presented Reissue Claim	81		8
Original Patent Claim	27		28

Presented Differences in the Claim Language Reissue Claim	Unlike original patent claim 29, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 29, presented reissue claim 81 does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 30, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode and the counter electrodes in contact with the gas to produce a change in an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrode in the absence of electrical measurement means." Unlike original patent claim 30, presented reissue claim 81 does not recite the language "means for applying a DC pulse power source across the membrane; said sensing and counter electrodes having in electrical connection therebetween said means for applying DC pulse power across the membrane; and switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the means for applying a DC pulse power source across the membrane; whereby, in a positive ambient concentration of said gas, said electrical measurement means to the sensing and counter electrodes; and whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the oas sensor where the counter electrode is placed when said switch means for applying a DC pulse power source across the membrane moves CO away from a side of the oas sensor where the counter electrode is placed when said switch means for applying a DC pulse power source across the membrane moves CO away from a side of the oas sensor where the counter electrode and such said switch means for applying a DC pulse power source across the mem
Prese	81		∞
Original Patent Claim	29		30

Differences in the Claim Language	Unlike original patent claim 31, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 31, presented reissue claim 81 does not recite the language "wherein said sensing and counter electrodes."	Unlike original patent claim 32, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 32, presented reissue claim 81 does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	81	81
Original Patent Claim	31	32

Differences in the Claim Language	Unlike original patent claim 33, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	sensing and counter electrodes comprise conductive metal oxides." Unlike original patent claim 34, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 34, presented reissue claim 81 does not recite the language wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ionexchange polymer."
Presented Reissue Claim	81	81
Original Patent Claim	33	34

Original 35 36	Presented Reissue Claim 81 81	Differences in the Claim Language Unlike original patent claim 35, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode. The anguage "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 35, presented reissue claim 81 recites the language "a two-electrode electrolyte membrane." Unlike original patent claim 36, presented reissue claim 81 recites the language "a two-electrode electrodemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode and the counter electrode being the only two electrodes in contact with the absence of an applied voltage to the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 36, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
37	81	Unlike original patent claim 37, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		electrochemical gas sensor is adapted to detect hydrogen."
38	81	Unlike original patent claim 38, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 38, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
39		Unlike original patent claim 39, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 39, presented reissue claim 81 does not recite the language "wherein the electrochemical pass sensor is adapted to detect H.O vanor."
40	81	Unlike original patent claim 40, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 40, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."

Differences in the Claim Language	Unlike original patent claim 41, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," and recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 42, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," and recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 42, presented reissue claim 81 does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	81	81
Original Patent Claim		42

Presented Differences in the Claim Language	Reissue Claim	Unlike original patent claim 43, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 43, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 44, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode being with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 44, presented reissue claim 81 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene to the conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene to the conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene to the conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene to the conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene to the conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene to the conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene to the conductor material for both the conductor material for
Original	Patent Claim	43		44

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
45		Unlike original patent claim 45, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 45, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
46		Unlike original patent claim 46, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 46, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."

Differences in the Claim Language	Unlike original patent claim 47, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 47, presented reissue claim 81 does not recite the language "a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to a chamber sealed off from the ambient atmosphere; said second porous pump electrode being exposed to a chamber sealed off from the ambient atmosphere; said second porous pump electrode being separated from said counter electrode by a perforated support structure composed of an electrical conducting material, both said second porous pump electrode and said counter electrode being in contact with said perforated support structure; means for electrical measurement in electrical contact with said sensing electrode and perforated support structure; whereby the gas is transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.
Presented Reissue Claim	81	·
Original Patent Claim	47	

Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 49, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 49, presented reissue claim 81 does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	81	81
Original Patent Claim	48	49

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
50		Unlike original patent claim 50, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 50, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
51		Unlike original patent claim 51, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 51, presented reissue claim 81 does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
52	81	Unlike original patent claim 52, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 52, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
53	81	Unlike original patent claim 53, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 53, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."

Original	Presented	Differences in the Claim Language
54	81	Unlike original patent claim 54, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 54, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
	81	Unlike original patent claim 55, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 55, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
56	81	Unlike original patent claim 56, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
57	81	Unlike original patent claim 57, presented reissue claim 81 recites the language "a two-electrode
		electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 57, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

Differences in the Claim Language	Unlike original patent claim 58, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 58, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adanted to detect H.S."	Unlike original patent claim 59, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "sind sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 59, presented reissue claim 81 does not recite the language "a protonic conductive electrolyte membrane being in contact with the counter electrode, means for electrical, the bottom side of said protonic conductive membrane being in contact with the sensing electrode; means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode and said reference electrode; whereby the gas is transported away from the reference electrode when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a BC power said electrical characteristic."
Presented Reissue Claim	81	81
Original Patent Claim	58	

Differences in the Claim Language	Unlike original patent claim 60, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 60, presented reissue claim 81 does not recite the language "wherein said sensing, count and reference electrodes comprise carbon."	Unlike original patent claim 61, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 61, presented reissue claim 81 does not recite the language "wherein said sensing, count and reference electrodes comprise noble metals."
Presented Reissue Claim	81	81
Original Patent Claim	09	61

Differences in the Claim Language	Unlike original patent claim 62, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 62, presented reissue claim 81 does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 63, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 63, presented reissue claim 81 does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ionexchange polymer."
Presented Reissue Claim	81		81
Original Patent Claim	62		

Differences in the Claim Language	Unlike original patent claim 64, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 65, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 65, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adanted to detect CO."
Presented Reissue Claim	81		
Original Patent Claim	64		9

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
99	81	Unlike original patent claim 66, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 66, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO."
	81	Unlike original patent claim 67, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 67, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."

Original 68 69	Presented 81 81	Differences in the Claim Language Unlike original patent claim 68, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode. The means are recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 68, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrode being the only two electrochemical gas sensor," recites the language "a first protonic conductive electrode being the only two electrodes in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode can applied voltage to the sensing electrode and the counter electrode being with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 69, presented reissue claim 81 does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

d Differences in the Claim Language	Unlike original patent claim 70, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 70, presented reissue claim 81 does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 71, presented reissue claim 81 does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a protonelectron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."
Presented Reissue Claim	8		
Original Patent Claim	70		71

Differences in the Claim Language		Unlike original patent claim 72, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 72, presented reissue claim 81 does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 73, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 73, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented	Keissue Claim	81	;	81
Original	Patent Claim	72		73

d Differences in the Claim Language	Unlike original patent claim 74, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 74, presented reissue claim 81 does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide."	Unlike original patent claim 75, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 75, presented reissue claim 81 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."
Presented Reissue Claim	81		81
Original Patent Claim	74		75

Differences in the Claim Language	Unlike original patent claim 76, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 76, presented reissue claim 81 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."	Unlike original patent claim 77, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 77, presented reissue claim 81 does not recite the language "wherein the sensing,	counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping electrodes."
Presented Reissue Claim	81		81	·
Original Patent Claim	9 <i>L</i>		11	

Differences in the Claim Language	Unlike original patent claim 78, presented reissue claim 81 recites the language "a two-electrode electrochemical gas sensor," recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, the sensing electrode reacting with the gas to produce a change in an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 78, presented reissue claim 81 does not recite the language "wherein the sensing, counter, and reference electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, and reference electrodes."
Presented Reissue Claim	81	
Original Patent Claim	78	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
-	. 82	Unlike original patent claim 1, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 1, presented reissue claim 82 does not recite the language "quantitative measurement."
2	82	Unlike original patent claim 2, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 2, presented reissue claim 82 does not recite the language "quantitative measurement," does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical connection between the sensing electrode, the counter electrode, and the
		means for applying DC power across the protonic conductive electrolyte membrane; and switch means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte
		membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes."
3	82	Unlike original patent claim 3, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 3, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise carbon."
4	82	Unlike original patent claim 4, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 4, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise noble metals."

Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 5, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 6, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	82		82	
Original Patent Claim	5		9	

Differences in the Claim Language	Unlike original patent claim 7, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 7, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	82		82	
Original Patent Claim	7		∞	·

Differences in the Claim Language		Unlike original patent claim 9, presented reissue claim 82 recites the language "the sensing electrode	and the counter electrode being on opposite sides of the first protonic conductive electrolyte	membrane Unlike original patent claim 9, presented reissue claim 82 does not recite the language "anantitative"	measurement," and also does not recite the language "wherein the electrochemical gas sensor is	adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 82 recites the language "the sensing	electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte	membrane."	Unlike original patent claim 10, presented reissue claim 82 does not recite the language "quantitative	measurement," and also does not recite the language "wherein the electrochemical gas sensor is	adapted to detect hydrogen."
Presented	Reissue Claim	82					82					
Original	Patent Claim	9.		,			10					

Differences in the Claim Language	Unlike original patent claim 11, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 11, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 12, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	82		85	
Original Patent Claim	11		12	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
13	. 82	Unlike original patent claim 13, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 13, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
14	82	Unlike original patent claim 14, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 14, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."

Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 15, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 16, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	82		87	
Original Patent Claim	15	•	16	

Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 17, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 18, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes.
Presented Reissue Claim	85		82	
Original Patent Claim	17	,	18	

Differences in the Claim Language	Unlike original patent claim 19, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 19, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 20, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented Reissue Claim	82		82	
Original Patent Claim	61		20	

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Differences in the Claim Language	Unlike original patent claim 21, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 21, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 22, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	82		82	
Original Patent Claim	21		22	

Original Patent Claim 23	Presented Reissue Claim 82	Unlike original patent claim 23, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 23, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
	85	Unlike original patent claim 24, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 24, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 25, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 26, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim	82		83	
Original Patent Claim	25		26	

Differences in the Claim Language	Unlike original patent claim 27, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane." Unlike original patent claim 27, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second portonic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes.	Unlike original patent claim 28, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane." Unlike original patent claim 28, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim		. 87
Original Patent Claim	27	28

Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane." Unlike original patent claim 29, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 30, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 30, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "said sensing and counter electrodes having electrically connected therebetween said means for electrical measurement; means for applying a DC pulse power across the membrane; and switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the means for applying a DC pulse power source across the membrane; when said switch means connects said electrical measurement means to the sensing and counter electrodes; and whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane counter electrodes."
Presented Reissue Claim	85	83
Original Patent Claim	29	30

Differences in the Claim Language	Unlike original patent claim 31, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 31, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 32, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 32, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	82		
Original Patent Claim	31		32

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
33	. 82	Unlike original patent claim 33, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each
		having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 33, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."
34	82	Unlike original patent claim 34, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 34, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

Differences in the Claim Language	Unlike original patent claim 35, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 35, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte	Unlike original patent claim 36, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing alectrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 36, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim		. 82
Original Patent Claim	35	36

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
		Unlike original patent claim 37, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 37, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "rein the electrochemical gas sensor is adapted to detect hydrogen."
38	82	Unlike original patent claim 38, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 38, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
39	85	Unlike original patent claim 39, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 39, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
. 40	85	Unlike original patent claim 40, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 40, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."

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Differences in the Claim Language	Unlike original patent claim 41, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 41, presented reissue claim 82 does not recite the language "quantitative measurement."	Unlike original patent claim 42, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 42, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	82		82	
Original Patent Claim	41		42	

Differences in the Claim Language	Unlike original patent claim 43, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 43, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 44, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 44, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	
Presented Reissue Claim	82		82		
Original Patent Claim	43		4		

Differences in the Claim Language	Unlike original patent claim 45, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 45, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 46, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 46, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."
Presented Reissue Claim		82
Original Patent Claim	45	46

Differences in the Claim Language	Unlike original patent claim 47, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 47, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "a second protonic conductive electrolyse membrane; first and second porous mixed ionic-electronic conductive pump electrodes, each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrode being exposed to a chamber sealed off from the ambient atmosphere; said second porous pump electrode being separated from said counter electrode by a perforated support structure composed of an electrical conducting material, both said second porous pump electrode and said counter electrode and perforated support structure; means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said sensing electrode and perforated support structure; whereby the gas is transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said electrical measurement means detects changes in said electrical characteristic"
Presented Reissue Claim		·
Original Patent Claim	47	

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Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 48, presented reissue claim 82 does not recite the language "quantitative measurement."	Unlike original patent claim 49, presented reissue claim 82 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 49, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	82		87	
Original Patent Claim	48		49	

Differences in the Claim Language	Unlike original patent claim 52, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 52, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first	and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum." Unlike original patent claim 53, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 53, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."
Presented Reissue Claim	83	82
Original Patent Claim	52	53

Presented Reissue Claim	Unlike original patent claim 54, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 54, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."	Unlike original patent claim 55, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 55, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adanted to detect hydrogen."
Original Patent Claim R	54		

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
56	83	Unlike original patent claim 56, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike, original patent claim 56, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
57		Unlike original patent claim 57, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 57, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

Original Pres Patent Rei Claim Claim Cl	Presented Differences in the Claim Language	Reissue Claim	Unlike original patent claim 58, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 58, presented reissue claim 82 does not recite the language "quantitative measurement,"	Unlike original patent claim 59, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 59, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "a porous mixed ionic-electronic conductive reference electrode having both an electrolyte membrane, having top and bottom sides, said top side of said protonic conductive membrane being in contact with the sensing electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode and the counter electrode; means for electrical measurement in electrical contact between the sensing electrode and the counter electrode; means for electrical measurement in electrical contact between the sensing electrode and the counter electrode and said reference electrode; when the means for applying a DC power across said protonic electrolyte membrane in electrode when the means for applying a DC power scross said protonic electrolyte and said protonic electrode when the means for applying a DC power scross said protonic electrode and said protonic electrolyte membrane in electrode when the means for applying a DC power scross said protonic electrode and said protonic electr
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Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
09.	82	Unlike original patent claim 60, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike, original patent claim 60, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, count and reference electrodes comprise carbon."
61	82	Unlike original patent claim 61, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim o1, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, count and reference electrodes comprise noble metals."

Presented Differences in the Claim Language Reissue Claim	Unlike original patent claim 62, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 62, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, counter and reference electrodes."	Unlike original patent claim 63, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 63, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte	•
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Original Patent Claim	62	63	

Differences in the Claim Language	Unlike original patent claim 64, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 64, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 65, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 65, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	82		
Original Patent Claim			65

Differences in the Claim Language	Unlike original patent claim 66, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 66, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is	adapted to detect NO _{x.} " Unlike original patent claim 67, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike original patent claim 67, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim		83
Original Patent Claim	99	29

Differences in the Claim Language	m	Unlike original patent claim 70, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 70, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 71, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."
Presented	Reissue Claim	83		83	
Original	Patent Claim	70		71	

Original Patent Claim	Presented Reissue Claim 82	Differences in the Claim Language [Inlike original natent claim 72 presented reisone claim 82 recites the language % first protonic
7	78	conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." Unlike, original patent claim 72, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a
73	82	Unlike original patent claim 73, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."
		Unlike original patent claim 73, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."

Presented Differences in the Claim Language	Reissue Claim	Unlike original patent claim 74, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 74, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide."	Unlike original patent claim 75, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 75, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting
Pres	Reissu				
Original	Patent Claim	74		75	

Differences in the Claim Language	Unlike original patent claim 76, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike, original patent claim 76, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."	Unlike original patent claim 77, presented reissue claim 82 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means."	Unlike original patent claim 77, presented reissue claim 82 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping electrodes."
Presented Reissue Claim	82		82	
Original Patent Claim			77	

Differences in the Claim Language		Unlike original patent claim 78, presented reissue claim 82 recites the language "a first protonic	conductive electrolyte membrane in between and in contact with the sensing and counter electrodes,	and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the	sensing electrode and the counter electrode being on opposite sides of the first protonic conductive	electrolyte membrane," and also recites the language "said sensing and counter electrodes each	having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to	said electrical measurement means."	Unlike, original patent claim 78, presented reissue claim 82 does not recite the language "quantitative	measurement," and also does not recite the language "wherein the sensing, counter, and reference	electrodes each have a first side opposite a second side, and wherein the ionic and electronic	conducting materials are continuous from the first side to the opposite second side within each of the	sensing, counter, and reference electrodes."
Presented	Reissue Claim	82											
Original	Patent Claim	78	-										

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
_		Unlike original patent claim 1, presented reassue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." This original natent claim 1 presented reissue claim 83 does not recite the language "on antitative measurement."
2	83	Unlike original patent claim 2, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 2, presented reissue claim 83 does not recite the language "quantitative measurement," does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical connection between the sensing electrode, the counter electrode, and the means for applying DC power across the protonic conductive electrolyte membrane; and switch means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes."
3	83	Unlike original patent claim 3, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 3, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise carbon."
4	83	Unlike original patent claim 4, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 4, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise noble metals."

Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 5, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 6, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	83		83	
Original Patent Claim	\$		9	
	•			

Differenced in the Claim I amount	Differences in the Cialin Language	Unlike original patent claim 7, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in context with the first protonic described.	Unlike original patent claim 7, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Dracented	Reissue Claim	83	,	83	
Original	Patent Claim	7		∞	

Differences in the Claim Language		Unlike original patent claim 9, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 9, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 10, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented	Reissue Claim	83		83	
Original	Patent Claim	6		10	

Differences in the Claim Language	Unlike original patent claim 11, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 11, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 12, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	83		83	
Original Patent Claim	11		12	

Presented Differences in the Claim Language	Reissue Claim	Unlike original patent claim 13, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 13, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 14, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 14, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material
Pres	Reissu				
Original	Patent Claim	13		14	

Differences in the Claim Language		Unlike original patent claim 15, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 15, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 16, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented	Reissue Claim	83	·	83	·
Original	Patent Claim	15		16	

Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 17, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 18, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes.
Presented Reissue Claim	83		83	
Original Patent Claim	17		18	

Differences in the Claim Language		Unlike original patent claim 19, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 19, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 20, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented	Reissue Claim	83		83	
Original	Patent Claim	19		20	

Differences in the Claim Language		Unlike original patent claim 21, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 21, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 22, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented	Reissue Claim	83		83	
Original	Patent Claim	21		22	

Differences in the Claim Language	Unlike original patent claim 23, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 23, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 24, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissne Claim	83		83	
Original Patent Claim	23		24	

Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 25, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 26, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim		83
Original Patent Claim	25	26

Original 27 27 28	Presented Reissue Claim 83	Differences in the Claim Language Unlike original patent claim 27, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolye membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolye membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolye membrane." Unlike original patent claim 27, presented reissue claim 83 does not recite the language "wherein the electrochemical gas sensor further measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second protonic conductive electrolyte membrane; first and second protonic conductive electrolyte membrane; and sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; and sensing and counter across said second protonic electrolyte membrane; said first and second protonic electrolyte membrane; and second protonic electrolyte membrane; said first and second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across said second protonic electrolyte membrane; and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane
		Unlike original patent claim 28, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 29, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	
Presented Reissue Claim	83	83
Original Patent Claim	29	30

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
31	83	Unlike original patent claim 31, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 31, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise carbon."
32	83	Unlike original patent claim 32, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 32, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise noble metals."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
33	83	Unlike original patent claim 33, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 33, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."
34	. 83	Unlike original patent claim 34, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 34, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

Differences in the Claim Language		Unlike original patent claim 35, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 35, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 36, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 36, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented	Reissue Claim			83
Original	Patent Claim	35		36

Differences in the Claim Language	Unlike original patent claim 37, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 37, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "rein the electrochemical gas sensor is adapted	Unlike original patent claim 38, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 38, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
Presented Reissue Claim	83	83
Original Patent Claim		38

Differences in the Claim Language	Unlike original patent claim 39, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 39, presented reissue claim 83 does not recite the language "quantitative measurement" and also does not recite the language "wherein the electrochemical gas sensor is	adapted to detect H ₂ O vapor." Unlike original patent claim 40, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 40, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
Presented Reissue Claim	83	. 83
Original Patent Claim	39	40

ed Differences in the Claim Language		Unlike original patent claim 41, presented reissue claim 83 does not recite the language "quantitative measurement."	Unlike original patent claim 42, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 42, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	83		83	
Original Patent Claim	41		42	

Differences in the Claim Language	Unlike original patent claim 43, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 43, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 44, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 44, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	83		83	
Original Patent Claim	43		44	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
45	83	
		conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, "society to 1 mm to 1 mm," society to 1 mm to
		. •
		electrolyte membrane," and also recites the language "said sensing and counter electrodes each
		having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to
		said electrical measurement means," and also recites the language "in which the sensing electrode
		and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Territory of the second
		magnitement" and also does not recite the larges (with magnited for the language "quantitative")
		incasurement, and also does not recite the failignage wherein one of the first and second electrical
		conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
46	83	
		conductive electrolyte membrane in between and in contact with the sensing and counter electrodes,
		and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the
		sensing electrode and the counter electrode being on opposite sides of the first protonic conductive
		electrolyte membrane," and also recites the language "said sensing and counter electrodes each
		having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to
		said electrical measurement means," and also recites the language "in which the sensing electrode
		and the counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte inclinitaile.
		Unlike original patent claim 46, presented reissue claim 83 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein one of the first and second electrical
		conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first
		and second ejectrical conductor materials for the counter ejectrode is 1-30 Wt% of Ku oxide.

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language,
47	83	Unlike original patent claim 47, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 47, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes, each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; said first porous pump electrode being separated from said counter electrode by a perforated support structure composed of an electrical conducting material, both said second porous pump electrode and said counter electrode being in contact with said perforated support structure; means for electrical measurement in electrical contact with said second protonic electrolyte membrane in electrical contact with said first pump electrode and said perforated support structure; whereby the gas is transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane; and perforate arrops said second protonic electrolyte membrane; and
		whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
48	83	Unlike original patent claim 48, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 48, presented reissue claim 83 does not recite the language "quantitative measurement."
49	83	Unlike original patent claim 49, presented reissue claim 83 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
·		Unlike original patent claim 49, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
50	83	Unlike original patent claim 50, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike, original patent claim 50, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
. 51		Unlike original patent claim 51, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 51, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

Differences in the Claim Language	U	Unlike original patent claim 52, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 53, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 53, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."
Presented	Reissue Claim	83		83
Original	Patent Claim	52		53

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
54	83	Unlike original patent claim 54, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike, original patent claim 54, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
55		Unlike original patent claim 55, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 55, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
56	83	Unlike original patent claim 56, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
57	83	Unlike original patent claim 57, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 57, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

Differences in the Claim Language	Unlike original patent claim 58, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike, original patent claim 58, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 59, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 59, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "a porous mixed ionic-electronic conductive reference electrode having both an electronic conducting material and an ionic conducting material" and does not recite the language "a protonic conductive membrane being in contact with the sensing electrode; the bottom sides, said top side of said protonic conductive membrane being in contact with the sensing electrode; the sensing electrode and the counter electrode; means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte."
Presented Reissue Claim	88	83
Original Patent Claim	58	29

Differences in the Claim Language	Unlike original patent claim 60, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike, original patent claim 60, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, count and reference electrodes comprise carbon."	Unlike original patent claim 61, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 61, presented reissue claim 83 does not recite the language "wherein said sensing, count and reference electrodes comprise noble metals."
Presented Reissue Claim	83	·	
Original Patent Claim	09		61

Differences in the Claim Language	Unlike original patent claim 62, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike, original patent claim 62, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 63, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 63, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	83		83
Original Patent Claim	62		

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
	. · .	Unlike original patent claim 64, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike, original patent claim 64, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."
65	83	Unlike original patent claim 65, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 65, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
99	83	Unlike original patent claim 66, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means, and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike, original patent claim 66, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
	83	Unlike original patent claim 67, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 67, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."

Original	Drecented	Differences in the Claim Language
Patent Claim	Reissue Claim	
89	83	Unlike original patent claim 68, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike, original patent claim 68, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is
69	83	undered to detect H ₂ S." Unlike original patent claim 69, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 69, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

Differences in the Claim Language	Unlike original patent claim 70, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike, original patent claim 70, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 71, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."
Presented Reissne Claim	83		83
Original Patent Claim	70		71

Differences in the Claim Language	Unlike original patent claim 72, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike, original patent claim 72, presented reissue claim 83 does not recite the language "quantitative" or the contact claim 72, presented reissue claim 83 does not recite the language "grant first protonic conductive" or the contact claim 72, presented reissue claim 83 does not recite the language "grant first protonic conductive" or grant claim 72, presented reissue claim 83 does not recite the language "grant first protonic conductive" or grant first protonic conductive first protonic conductive first protonic conductive membrane."	measurement, and also does not recite the failignage. Wherein the proton conductor material for bounthe sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 73, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	83.	·		
Original Patent Claim	. 72		73	

Differences in the Claim Language	Unlike original patent claim 74, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike, original patent claim 74, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide."	Unlike original patent claim 75, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 75, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."
Presented Reissue Claim	83		83
Original Patent Claim	74	·	75

Differences in the Claim Language	Unlike original patent claim 76, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike, original patent claim 76, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."	Unlike original patent claim 77, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 77, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping electrodes."
Presented Reissue Claim	83		83	
Original Patent Claim	76		77	

Differences in the Claim Language		Unlike original patent claim 78, presented reissue claim 83 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike, original patent claim 78, presented reissue claim 83 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter, and reference electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, and reference electrodes."
Presented	Reissue Claim	83	
Original	Patent Claim	78	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
-	84	Unlike original patent claim 1, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 1, presented reissue claim 84 does not recite the language "quantitative measurement."
2	84	Unlike original patent claim 2, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 2, presented reissue claim 84 does not recite the language "quantitative measurement," does
		connection between the sensing electrode, the counter electrode, and the means for applying DC power across the protonic conductive electrolyte membrane; and switch means for alternating an electrical connection between the sensing
		electrode and counter electrode from the electrical measurement means to the means for applying DC power across the
		protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the
		means for applying DC power across the protonic conductive electrolist memorate applies a DC power to the scining and counter electrodes."
3	84	Unlike original patent claim 3, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 3, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise carbon."
4	84	Unlike original patent claim 4, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 4, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise noble metals."

ed Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 5, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 6, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	84		84	
Original Patent Claim	5		9	

Differences in the Claim Language		Unlike original patent claim 7, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 7, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 8, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented	Reissue Claim	84		84	
Original	Patent Claim	7		8	

Differences in the Claim Language		Unlike original patent claim 9, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 9, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 10, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented	Reissue Claim	84		84	
Original	Patent Claim	6		10	

Differences in the Claim Language	Unlike original patent claim 11, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 11, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 12, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented	84		84	
Original	11		12	

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Differences in the Claim Language	Unlike original patent claim 13, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 13, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 14, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 14, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
Presented Reissue Claim	84		84	
Original Patent Claim	13		14	

Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 15, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 16, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	84		84	
Original Patent Claim	15	·	16	

Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 17, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 18, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes.
Presented Reissue Claim	84		84	
Original Patent Claim			18	

Differences in the Claim Language		Unlike original patent claim 19, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 19, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 20, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented	Reissue Claim	84		84	
Original	Patent Claim	19		20	

d Differences in the Claim Language	Unlike original patent claim 21, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 21, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 22, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	84		84	,
Original Patent Claim	21		22	

Differences in the Claim Language	Unlike original patent claim 23, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 23, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 24, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	84		84	
Original Patent Claim	23		24	

Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 25, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 26, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim	84		84	
Original Patent Claim	25		26	

Differences in the Claim Language	Unlike original patent claim 27, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 27, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrolyse membrane; means for applying a DC power across said second protonic electrolyte membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across said second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes.	Unlike original patent claim 28, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 28, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	84		84	·
Original Patent Claim	27		28	

Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 29, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 30, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 30, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "said sensing and counter electrodes having electrically connected therebetween said means for electrical measurement; means for applying a DC pulse power source across the membrane; said sensing and counter electrodes having in electrical connection therebetween said means for applying DC pulse power across the membrane; when said switch means connects said electrical measurement means to the means for applying a DC pulse power source across the membrane; when said switch means connects said electrical measurement means to the sensing and counter electrodes; and whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane electrodes."
Presented Reissue Claim	84		84	
Original Patent Claim	29		30	

Patent Claim Reissue Claim 31 84 32 84	Unlike original patent claim 31, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
84	Unlike original patent claim 31, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 31, presented reissue claim 84 does not recite the language "quantitative
84	conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 31, presented reissue claim 84 does not recite the language "quantitative
	and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 31, presented reissue claim 84 does not recite the language "quantitative"
	sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 31, presented reissue claim 84 does not recite the language "quantitative
	electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 31, presented reissue claim 84 does not recite the language "quantitative"
	having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 31, presented reissue claim 84 does not recite the language "quantitative
84	said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 31, presented reissue claim 84 does not recite the language "quantitative
	reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 31, presented reissue claim 84 does not recite the language "quantitative"
	Unlike original patent claim 31, presented reissue claim 84 does not recite the language "quantitative
	measurement," and also does not recite the language "wherein said sensing and counter electrodes
	comprise carbon."
	Unlike original patent claim 32, presented reissue claim 84 recites the language "a first protonic
	conductive electrolyte membrane in between and in contact with the sensing and counter electrodes,
	and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the
	sensing electrode and the counter electrode being on opposite sides of the first protonic conductive
	electrolyte membrane," and also recites the language "said sensing and counter electrodes each
	having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to
	said electrical measurement means," and also recites the language "in which the sensing electrode
	reacts with the gas in the absence of an applied voltage to the sensing electrode."
	Unlike original patent claim 32, presented reissue claim 84 does not recite the language "quantitative
4.	measurement," and also does not recite the language "wherein said sensing and counter electrodes
	comprise noble metals."

Differences in the Claim Language	Unlike original patent claim 33, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 33, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 34, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language to the sensing electrode." Unlike original patent claim 34, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte	membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Peissue Claim	84		84	
Original Dotant Claim	33		34	

Differences in the Claim Language	Unlike original patent claim 35, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 35, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 36, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 36, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	84		84
Original Patent Claim	35		36

Differences in the Claim Language	Unlike original patent claim 37, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 37, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "rein the electrochemical gas sensor is adapted to detect hydrogen."	Unlike original patent claim 38, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 38, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
Presented Reissue Claim	84	·	8	
Original Patent Claim	37		38	

1 Differences in the Claim Language		Unlike original patent claim 39, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 39, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."	Unlike original patent claim 40, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means" and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 40, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is
Presented	Reissue Claim	84		88
Original	Patent Claim	39	·	40

Differences in the Claim Language	Unlike original patent claim 41, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 41, presented reissue claim 84 does not recite the language "quantitative measurement."	Unlike original patent claim 42, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 42, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	84		84	
Original Patent Claim	41	·	42	

Differences in the Claim Language	Unlike original patent claim 43, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 43, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 44, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 44, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	8		84	
Original Patent Claim	43		44	

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
45	84	Unlike original patent claim 45, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 45, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
46	84	Unlike original patent claim 46, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 46, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."

Differences in the Claim Language	Unlike original patent claim 47, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each baving a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 47, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "a second protonic conductive pump electrodes, each having both an electronic conductive material, and an ionic conductive pump electrodes, each having both an electrode being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said sensing and counter electrode by a perforated support structure composed of an electrical conducting material, both said second porous pump electrode being exposed to a chamber sealed off from the ambient structure; means for applying a DC power across said second protonic electrode being in contact with said sensing electrode by a perforated support structure; means for applying a DC power across said second protonic electrody measurement in electrical contact with said sensing electrode and perforated support structure; means for applying a DC power across said second protonic electrody membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across
Presented Reissue Claim	8
Original Patent Claim	47

Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 48, presented reissue claim 84 does not recite the language "quantitative measurement."	Unlike original patent claim 49, presented reissue claim 84 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 49, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	84		84	
Original Patent Claim	48		49	

Differences in the Claim Language	Unlike original patent claim 50, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike, original patent claim 50, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical	Unlike original patent claim 51, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 51, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	84	84
Original Patent Claim	50	51

Presented Differences in the Claim Language Reissue Claim		Unlike, original patent claim 52, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike orig conductive and having sensing electrolyte having a disadd electric reacts with	Unlike original patent claim 53, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."
Prese Reissue	∞		84	
Original Patent Claim	52		53	

Differences in the Claim Language	Unlike original patent claim 54, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 54, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."	Unlike original patent claim 55, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 55, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim			84
Original Patent Claim	54		55

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
95	84	Unlike original patent claim 56, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike, original patent claim 56, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
57	48	Unlike original patent claim 57, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 57, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

d Differences in the Claim Language	Unlike original patent claim 58, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike, original patent claim 58, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 59, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 59, presented reissue claim 84 does not recite the language "a protonic conductive measurement," and also does not recite the language "a protonic conductive electrodic material and an ionic conducting material" and does not recite the language "a protonic conductive membrane, having top and bottom sides, said top side of said protonic conductive membrane being in contact with the sensing electrode; the sensing electrode and the reference electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode and the counter electrode, means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane."
Presented Reissue Claim	84	
Original Patent Claim	58	59

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
09	84	Unlike origonative and having sensing electrolyte having a disaid electrire reacts with Unlike, origneasureme
61	84	Unlike original patent claim 61, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 61, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, count and reference electrodes comprise noble metals."

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
62	84	Unlike original patent claim 62, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike, original patent claim 62, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."
63	84	Unlike original patent claim 63, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 63, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

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Differences in the Claim Language	Unlike original patent claim 64, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 64, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 65, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 65, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	84		84
Original Patent Claim	64		65

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
99	84	Unlike original patent claim 66, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike, original patent claim 66, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
67	2	Unlike original patent claim 67, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 67, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
89	84	Unlike original patent claim 68, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in hetween and in contact with the conductive electrolyte membrane in hetween and in contact with the conductive electrolyte membrane in hetween and in contact with the conductive electrolyte membrane in hetween and in contact with the conductive electrolyte membrane in hetween and in contact with the conductive electrolyte membrane in hetween and in contact with the conductive electrolyte membrane in hetween and in contact with the conductive electrolyte membrane in hetween and in contact with the conductive electrolyte membrane in hetween and in contact with the conductive electrolyte membrane in hetween and in contact with the conductive electrolyte membrane in hetween and in contact with the conductive electrolyte membrane in hetween and in contact with the conductive electrolyte membrane in hetween and in contact with the conductive electrolyte membrane in hetween and in contact with the conductive electrolyte membrane in hetween and in contact with the conductive electrolyte membrane in hetween and in contact with the conductive electrolyte membrane in hetween and in contact with the conductive electrolyte membrane in hetween and in contact with the conductive electrolyte electrolyt
		and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the
		بي
		electrolyte membrane," and also recites the language "said sensing and counter electrodes each
		having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means." and also recites the language "in which the consists of the language "in which th
		reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Inite original notant claim 68 meacauted nations of decree 42.1. 11.1.
		Chiline, Girginal parent chaint 00, presented reissue chaint 04 does not recite the language "quantitative"
		measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H.S."
69	84	Unlike original patent claim 69, presented reissue claim 84 recites the language "a first protonic
		conductive electrolyte membrane in between and in contact with the sensing and counter electrodes,
		and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the
		sensing electrode and the counter electrode being on opposite sides of the first protonic conductive
		electrolyte membrane," and also recites the language "said sensing and counter electrodes each
		having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to
		said electrical measurement means," and also recites the language "in which the sensing electrode
		reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 69, presented reissue claim 84 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the electrochemical gas sensor is

Original Patent Claim 70 71	Presented Reissue Claim 84 84	Unlike original patent claim 70, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike, original patent claim 70, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm." Unlike original patent claim 71, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrodes each electrolyte membrane," and also recites the language "said sensing and counter electrodes each electrolyte membrane," and also recites the language "said sensing and counter electrodes each
		having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 71, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."

Differences in the Claim Language		Unlike original patent claim 72, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 72, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 73, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 73, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented	Reissue Claim	84	·	8	
Original	Patent Claim	72		73	

Differences in the Claim Language	Unlike original patent claim 74, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike, original patent claim 74, presented reissue claim 84 does not recite the language "quantitative	measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide."	Unlike original patent claim 75, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 75, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side, within each of the sensing and counter electrodes."
Presented Reissue Claim	84		84
Original Patent Claim	74		75

Differences in the Claim Language	Unlike original patent claim 76, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 76, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."	Unlike original patent claim 77, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 77, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping electrodes."
Presented Reissue Claim	84		84	
Original Patent Claim			77	

Differences in the Claim Language		Unlike original patent claim 78, presented reissue claim 84 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 78, presented reissue claim 84 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter, and reference electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, and reference electrodes."
Presented	Reissue Claim	84	
Original	Patent Claim	78	

Presented Differences in the Claim Language Reissue Claim	Unlike original patent claim 1, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 1, presented reissue claim 85 does not recite the language "quantitative measurement."		Unlike original patent claim 2, presented reissue claim 85 does not recite the language "quantitative measurement," does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical connection between the sensing electrode, the counter electrode, and the means for applying DC power across the protonic conductive electrody membrane; and switch means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes."	Unlike original patent claim 3, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 3, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 4, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 4, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presi Reissu	-	00			
Original Patent Claim		2		ĸ	4

Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 5, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides,"	Unlike original patent claim 6, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 6, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	. 85		85	
Original Patent Claim	\$		9	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
7	85	Unlike original patent claim 7, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte
		membrane," and also recites the language "in which the sensing electrode and the counter electrode
		are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and
	-	also recites the language "in which the sensing electrode reacts with the gas in the absence of an
		applied voltage to the sensing electrode."
		Unlike original patent claim 7, presented reissue claim 85 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the protonic conductive electrolyte
		membrane is a metal oxide protonic conductor electrolyte membrane."
8	85	Unlike original patent claim 8, presented reissue claim 85 recites the language "the sensing electrode
	,	and the counter electrode being on opposite sides of the first protonic conductive electrolyte
		membrane," and also recites the language "in which the sensing electrode and the counter electrode
		are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and
		also recites the language "in which the sensing electrode reacts with the gas in the absence of an
		applied voltage to the sensing electrode."
		Unlike original patent claim 8, presented reissue claim 85 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the electrochemical gas sensor is
		adapted to detect CO."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
6	85	Unlike original patent claim 9, presented reissue claim 85 recites the language "the sensing electrode
		and the counter electrode being on opposite sides of the first protonic conductive electrolyte
		membrane," and also recites the language "in which the sensing electrode and the counter electrode
		are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and
		also recites the language "in which the sensing electrode reacts with the gas in the absence of an
		applied voltage to the sensing electrode."
		Unlike original patent claim 9, presented reissue claim 85 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the electrochemical gas sensor is
		adapted to detect NO _x ."
10	85	Unlike original patent claim 10, presented reissue claim 85 recites the language "the sensing
		electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte
		membrane," and also recites the language "in which the sensing electrode and the counter electrode
		are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and
		also recites the language "in which the sensing electrode reacts with the gas in the absence of an
		applied voltage to the sensing electrode."
		Unlike original patent claim 10, presented reissue claim 85 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the electrochemical gas sensor is
		adapted to detect hydrogen."

Differences in the Claim Language	u	Unlike original patent claim 11, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and	also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode	are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 12, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect Hong wange."
Presented	Reissue Claim	82			85		
Original	Patent Claim	Ξ			12		

ed Differences in the Claim Language	Unlike original patent claim 13, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 13, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 14, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 14, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical
Presented Reissue Claim	85		85	
Original Patent Claim			14	

Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 15, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 16, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Deigns Claim	85		88	
Original Patent Claim	15	·	16	

Presented Differences in the Claim Language	Reissue Claim	Unlike original patent claim 17, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 17, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 18, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane.
Original	Patent Claim I	17		18	

Differences in the Claim Language	Unlike original patent claim 19, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 19, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 20, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented Reissue Claim	85		85	
Original Patent Claim	19		20	

ted Differences in the Claim Language	-	Unlike original patent claim 21, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode	are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an	applied voltage to the sensing electrode.	measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 85 recites the language "the sensing	membrane," and also recites the language "in which the sensing electrode and the counter electrode	are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and	applied voltage to the sensing electrode."	Unlike original patent claim 22, presented reissue claim 85 does not recite the language "quantitative	measurement," and also does not recite the language "wherein the first and second pumping	electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane	
Presented	Reissue Claim	82	,			85							
Original	Patent Claim	21				22							

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
23	85	Unlike original patent claim 23, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 23, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
24	. 85	Unlike original patent claim 24, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 24, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 25, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 26, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim			82	
Original Patent Claim	25		26	

Presented Reissue Claim Language	Unlike original patent claim 27, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrode are the only two electrodes in contact with the first protonic conductive electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 27, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; membrane; means for applying a DC power across said second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes.	Unlike original patent claim 28, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrolyte membrane," and also recites the language "in which the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 28, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid perfluorinated ion-exchange polymer."
Original Patent Claim	27		28

Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 29, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 30, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing electrode are the town of the means," and also recites the language "said also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 30, presented reissue claim 85 does not recite the language "said sensing and counter electrodes having electrical measurement," and also does not recite the language "said sensing and counter electrodes having in electrical connection therebetween said means for electrical measurement means for applying a DC pulse power source across the membrane; said sensing and counter electrodes from the electrical measurement means for applying a DC pulse power source across the membrane; when said switch means connects said electrical measurement means to the sensing and counter electrodes; and whereby said means for applying a DC pulse power source across the membrane; where the counter electrode is placed when said switch means counter electrodes is placed when said switch means connects said means for applying a DC pulse power source across the membrane connects said means for applying a DC pulse power source across the membrane connects said means for applying a DC pulse power source across the membrane to the sensing and counter electrodes."
Presented Reissue Claim	85		88
Original Patent Claim	29		30

Differences in the Claim Language	Unlike original patent claim 31, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 31, presented reissue claim 85 does not recite the language "quantitative	measurement, and also does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 32, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 32, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	85		85
Original Patent Claim	31		32

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
33	82	Unlike original patent claim 33, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 33, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."
34	85	Unlike original patent claim 34, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 34, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
35		Unlike original patent claim 35, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 35, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."
36		Unlike original patent claim 36, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 36, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."

Presented Differences in the Claim Language Reissue Claim	Unlike original patent claim 37, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the gas in the absence of an applied voltage to the sensing electrode." and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 37, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "rein the electrochemical gas sensor is adapted to detect hydrogen."	Unlike original patent claim 38, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 38, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to
Original Patent Claim Rei			38

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
39	85	Unlike original patent claim 39, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 39, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
40	82	Unlike original patent claim 40, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 40, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect NOx."

Differences in the Claim Language	u	Unlike original patent claim 41, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 41, presented reissue claim 85 does not recite the language "quantitative measurement."	Unlike original patent claim 42, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 42, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented	Reissue Claim	88		88	•
Original	Patent Claim	41		42	-

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
43	88	Unlike original patent claim 43, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		neasurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
44		Unlike original patent claim 44, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 44, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

d Differences in the Claim Language	Unlike original patent claim 45, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 45, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 46, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 46, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second
Presented Reissue Claim	88		88
Original Patent Claim	45		46

Unlike original patent claim 47, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "and sensing and counter electrode each having a diameter in the range of approximately 1 mm to 15 mm, and being electrodal connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electroly connected to said electrical measurement means," and also recites the fraguage "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electroly enembrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes. Unlike original patent claim 47, presented reissue claim 85 does not recite the language "in which the sensing separated from said seoning and counter electrodes and stored protons in material and an ionic conductive pump electrodes, each having both an electronic separate from said sensing and counter electrodes and situated on opposite sites, of an electrolist conductive electrolyte membrane; said first porous pump electrode being exparated from said seoning measurement in electrical conductive means for electrical measurement in electrical contact with said second protous pump electrode and said counter electrode by a perforated support structure; means for electrical measurement in electrical contact with said second protous pump electrode and said counter electrode being second protous pump electrode and said counter electrode and said counter electrode being second protous pump electr	Original	Presented	Differences in the Claim Language
\$8	Patent Claim	Reissue Claim	
electrolyte membrane in between and in contact with the sensing and counter electrodes, and having thickness in the range of approximately 0.1 mm to 1 mm. ² recites the language "the sensing electrode and to counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and all recites the language "said sensing and counter electrodes each having a diameter in the range of approximatel 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites 1 language "in which the sensing electrodes and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 47, presented reissue claim 85 does not recite the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 47, presented reissue claim 85 does not recite the language "wantitati measurement," and sleo does not recite the language "as econd portonic conductive membrane; and second portons mixed ionic-electronic conductive pump electrodes, each having both an electroc conductive material and an ionic conducting material, each of said first and second protonic conductive electrolyte membrane, said second portons pump electrode by a perforated support structure composed of an electrical conductive method and said counter electrode being in contact with said sensing electrode by a perforated support structure composed of an electrical contact with said electrical contact with said sensing electrode and said counter electrode being in contact with said sensing electrode and support structure; means for electrical measurement in electrical contact with said first pump electrode and said second protonic electrolyte membrane and second protonic electrolyte membrane an	47	85	Unlike original patent claim 47, presented reissue claim 85 recites the language "a first protonic conductive
thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and to counter electrode being on opposite sides of the first protonic conductive electrolyte membrane, and all recites the language "said sensing and counter electrodes each having a diameter in the range of approximate 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites 1 language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites; the language "in which the sensing electrode and the counter electrode are the only two electrodes." Unlike original patent claim 47, presented reissue claim 85 does not recite the language "quantitati measurement," and also does not recite the language "as escond promic conductive electrolyte membrane; find as escond porous mixed ionic-electronic conductive pump electrodes, each having both an electron conductive material and an ionic conducting material, each of said first and second pump electrodes being exposed to chamber sealed off from the ambient atmosphere; said second porous pump electrode being exposed to chamber sealed off from the ambient atmosphere; said second porous pump electrode being exposed to chamber sealed off from the ambient atmosphere; said second porous pump electrode and said counter electrode being in contact with said perforated support structure composed of an electrical conducting material, be said second porous pump electrode and said counter electrode being in contact with said perforated support structure; means for electrical measurement in electrical contact with said for propule membrane applies a DC power across said second protonic electrolyte membrane electrical contact with said feet membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane said electrical loanated planated planated in a			electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a
counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and all recites the language "said sensing and counter electrodes each having a diameter in the range of approximate 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane, first possible to the sensing electrode." Unlike original patent claim 47, presented reissue claim 85 does not recite the language "quantitati measurement," and also does not recite the language "a second protonic conductive electrolyte membrane, first and second porous mixed ionic-electronic conductive pump electrodes, each having both an electrode separate from said sensing and counter electrodes and situated on opposite sides of and in contact with sa second protonic conductive electroly membrane; said first porous pump electrode being separated first second porous pump electrode by a perforated support structure composed of an electrical conductive means for electrical measurement in electrical contact with said perforated support structure; means for electrical measurement in electrode being in contact with said perforated support structure; means for applying a DC power across said second protonic electrolyte membrane electrode and said perforated support structure; whereby the gas transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte ambient connected each gas said electrical measurement means detects changes said electrical contact statics."			thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the
recites the language "said sensing and counter electrodes each having a diameter in the range of approximate I mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites I language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electroly membrane," and also recites the language "in which the sensing electrode are the only two electrodes." Unlike original patent claim 47, presented reissue claim 85 does not recite the language "duantitati measurement," and also does not recite the language "a second protonic conductive electrolyte membrane; fin and second porous mixed ionic-electronic conductive pump electrodes, each having both an electrode conductive material and an ionic conductive material, each of said first and second pump electrodes being exposed to conductive material and an ionic conducting material, each of said first and second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to chamber sealed off from the ambient amosphere, said second porous pump electrode being exposed to chamber sealed off from the ambient amosphere, said second porous pump electrode being separated from said second protonic conductive and said counter electrode being in contact with said perforated support structure; means for electrical measurement in electrical contact with said seriond perforated support structure; whereby the gas transported away from the counter electrode and said perforated support structure; whereby the gas protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said electrical measurement in electrode when the means for applying a Dc power across said electrical enhancements and electrical conductive."			counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also
I mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites thanguage "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode are an applied voltage to the sensing electrode." which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 47, presented reissue claim 85 does not recite the language "quantitati measurement," and also does not recite the language "a second protonic conductive electrolyte membrane; fin and second porous mixed ionic-electronic conductive pump electrodes, each having both an electron conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with as second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to chamber sealed off from the ambient atmosphere; said second porous pump electrode and said counter electrode being in contact with said perforated support structure; means for electrical measurement in electrical contact with said perforated support structure; means for applying a DC power across said second protonic electrolyte membrane electrical contact with said first pump electrode and said perforated support structure; whereby the gas transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said electrical measurement means detects changes said electrical characteristic."			recites the language "said sensing and counter electrodes each having a diameter in the range of approximately
language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 47, presented reissue claim 85 does not recite the language "quantitati measurement," and also does not recite the language "a second protonic conductive electrolyte membrane; fin and second porous mixed ionic-electronic conductive pump electrodes, each having both an electron conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with sa second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to chamber sealed off from the ambient atmosphere; said second porous pump electrode being separated fros said second porous pump electrode and said counter electrode being in contact with said perforated support structure; means for electrical measurement in electrical contact with said perforated support structure; means for electrical measurement in electrical contact with said perforated support structure; whereby the gas transported away from the counter electrode and said perforated support structure; whereby the gas transported away from the counter electrode and said electrical measurement means detects changes said electrical characteristic."			1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the
the first protonic conductive electrolyte membrane," and also recites the language "in which the sensis electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 47, presented reissue claim 85 does not recite the language "quantitati measurement," and also does not recite the language "a second protonic conductive electrolyte membrane; said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with sa second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to chamber sealed off from the ambient atmosphere; said second porous pump electrode being exposed to chamber sealed off from the ambient atmosphere; said second porous pump electrode being support structure; means for electrical counter electrode being in contact with said perforated support structure; means for electrical measurement in electrical contact with said sensing electrode and support structure; means for applying a DC power across said second protonic electrolyte membrane electrical contact with said first pump electrode and said perforated support structure; whereby the gas transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane; an whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes said electrical characteristic."			language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with
Unlike original patent claim 47, presented reissue claim 85 does not recite the language "quantitati measurement," and also does not recite the language "a second protonic conductive electrolyte membrane; fin and second porous mixed ionic-electronic conductive pump electrodes, each having both an electron conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with sas second protonic conductive electrolyte membrane; said first porous pump electrode being separated fro said counter electrode by a perforated support structure composed of an electrical conducting material, bo said second porous pump electrode and said counter electrode being in contact with said perforated support structure; means for electrical measurement in electrical contact with said perforated support structure; means for electrical measurement in electrical contact with said perforated support structure; means for epiplying a DC power across said second protonic electrolyte membrane electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said electrical measurement means detects changes said electrical characteristic."			the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing
			electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
			Unlike original patent claim 47, presented reissue claim 85 does not recite the language "anantitative
			measurement," and also does not recite the language "a second protonic conductive electrolyte membrane; first
conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with sa second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to chamber sealed off from the ambient atmosphere; said second porous pump electrode by a perforated support structure composed of an electrical conducting material, bo said second porous pump electrode and said counter electrode being in contact with said perforated support structure; means for electrical measurement in electrical contact with said first pump electrode and said perforated support structure; whereby the gas transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes said electrical characteristic."			and second porous mixed ionic-electronic conductive pump electrodes, each having both an electronic
separate from said sensing and counter electrodes and situated on opposite sides of and in contact with sa second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to chamber sealed off from the ambient atmosphere; said second porous pump electrode being separated from said counter electrode by a perforated support structure composed of an electrical conducting material, both said second porous pump electrode and said counter electrode being in contact with said perforated support structure; means for electrical measurement in electrical contact with said second protonic electrolyte membrane electrode and said perforated support structure; whereby the gas transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said electrical measurement means detects changes said electrical characteristic."			conductive material and an ionic conducting material, each of said first and second pump electrodes being
second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to chamber sealed off from the ambient atmosphere; said second porous pump electrode by a perforated support structure composed of an electrical conducting material, be said second porous pump electrode and said counter electrode being in contact with said perforated support structure; means for electrical measurement in electrical contact with said electrode and perforate support structure; means for applying a DC power across said second protonic electrolyte membrane electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane applies a BC power across said second protonic electrolyte membrane applies a BC power across said electrical measurement means detects changes said electrical characteristic."			separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said
chamber sealed off from the ambient atmosphere; said second porous pump electrode being separated fro said counter electrode by a perforated support structure composed of an electrical conducting material, bo said second porous pump electrode and said counter electrode being in contact with said perforated support structure; means for electrical measurement in electrical contact with said sensing electrode and perforate support structure; means for applying a DC power across said second protonic electrolyte membrane electrical contact with said first pump electrode and said perforated support structure; whereby the gas transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes said electrical characteristic."			second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to a
said second porous pump electrode and said counter electrode being in contact with said perforated suppositive amports structure; means for electrical measurement in electrical contact with said sensing electrode and perforate support structure; means for applying a DC power across said second protonic electrolyte membrane electrical contact with said first pump electrode and said perforated support structure; whereby the gas transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes said electrical characteristic."			chamber sealed off from the ambient atmosphere; said second porous pump electrode being separated from
said second porous pump electrode and said counter electrode being in contact with said perforated structure; means for electrical measurement in electrical contact with said sensing electrode and perforate support structure; means for applying a DC power across said second protonic electrolyte membrane electrical contact with said first pump electrode and said perforated support structure; whereby the gas transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes said electrical characteristic."			said counter electrode by a perforated support structure composed of an electrical conducting material, both
structure; means for electrical measurement in electrical contact with said sensing electrode and perforate support structure; means for applying a DC power across said second protonic electrolyte membrane electrical contact with said first pump electrode and said perforated support structure; whereby the gas transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes said electrical characteristic."			said second porous pump electrode and said counter electrode being in contact with said perforated support
support structure; means for applying a DC power across said second protonic electrolyte membrane electrical contact with said first pump electrode and said perforated support structure; whereby the gas transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane; an whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes said electrical characteristic."			structure; means for electrical measurement in electrical contact with said sensing electrode and perforated
electrical contact with said first pump electrode and said perforated support structure; whereby the gas transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane; a whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes said electrical characteristic."			support structure; means for applying a DC power across said second protonic electrolyte membrane in
transported away from the counter electrode when the means for applying a DC power across said secon protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane; an whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes said electrical characteristic."			electrical contact with said first pump electrode and said perforated support structure; whereby the gas is
protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane; a whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes said electrical characteristic."			transported away from the counter electrode when the means for applying a DC power across said second
whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes said electrical characteristic."			protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane; and
said electrical characteristic."	•		whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in
			said electrical characteristic."

Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 48, presented reissue claim 85 does not recite the language "quantitative	Unlike original patent claim 49, presented reissue claim 85 recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane, and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 49, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	85	85
Original Patent Claim	48	49

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
50	85	Unlike original patent claim 50, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike, original patent claim 50, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
51	82	Unlike original patent claim 51, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "on the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 51, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

Differences in the Claim Language	Unlike original patent claim 52, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike, original patent claim 52, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second	Unlike original patent claim 53, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 53, presented reissue claim 85 does not recite the language "wherein one of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."
Presented Reissue Claim		82
Original Patent Claim	52	53

Presented Differences in the Claim Language	Reissue Claim	Unlike original patent claim 54, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."	Unlike original patent claim 55, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode of an applied voltage to the sensing electrode." Unlike original patent claim 55, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to
Pres	Reissu	····	: 	
Original	Patent Claim	54		55

Original S6 56	Presented Reissue Claim 85 85	
		electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 57, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

Differences in the Claim Language	Unlike original patent claim 58, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode." Unlike, original patent claim 58, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 59, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrode being on opposite sides of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrode measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 59, presented reissue claim 85 does not recite the language "a protonic conductive membrane being in contact with the counter electrode, newtherance and bottom sides, said top side of said protonic conductive membrane being in contact with the counter electrode; the sensing electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode and the reference electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode, means for abange in an electrical characteristic between the sensing electrode and the counter electrode; means for electrode, means for electrical measurement in electrical contact between the sensing electrode and said reference electrode, whereby the gas is transported away from the reference electrode when the means for applying a DC power across said protonic electrolyte membrane applying electrode electrodyte membrane applying electrodyte membrane applying electrodyte membrane applying electrodyte mem
Presented Reissue Claim	85	85
Original Patent Claim	28	59

Ited Differences in the Claim Language Claim	Unlike original patent claim 60, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike, original patent claim 60, presented reissue claim 85 does not recite the language "quantitative	measurement," and also does not recite the language "wherein said sensing, count and reference electrodes comprise carbon."	Unlike original patent claim 61, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 61, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, count and reference productions."
Presented Reissue Claim			88
Original Patent Claim	09		61

Differences in the Claim Language	Unlike original patent claim 62, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 62, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 63, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts of an applied voltage to the sensing electrode." Unlike original patent claim 63, presented reissue claim 85 does not recite the language "quantitative membrane;" and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	85		85
Original Patent Claim			

Differences in the Claim Language	Unlike original patent claim 64, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 64, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 65, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 65, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim			85
Original Patent Claim	64		

Differences in the Claim Language	Unlike original patent claim 68, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 68, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 69, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 69, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim		·	
Original Patent Claim	. 89		

Differences in the Claim Language sim	Unlike original patent claim 70, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 70, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 71, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50	wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."
Presented Reissue Claim	88		88	
Original Patent Claim	70		71	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
72	85	Unlike original patent claim 72, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike, original patent claim 72, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
73		Unlike original patent claim 73, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 73, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
74	85	Unlike original patent claim 74, presented reissue claim 85 recites the language "a first protonic conductive
		electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a
		thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also
		recites the language "said sensing and counter electrodes each having a diameter in the range of approximately
		I mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the
		language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with
		the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing
		electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
		Unlike, original patent claim 74, presented reissue claim 85 does not recite the language "quantitative"
		measurement," and also does not recite the language "wherein one of the first and second electrical conductor
		materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and
		second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide."
75	85	Unlike original patent claim 75, presented reissue claim 85 recites the language "a first protonic conductive
		electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a
		thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also
		recites the language "said sensing and counter electrodes each having a diameter in the range of approximately
		I mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the
		language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with
		the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing
		electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."
-		The life entrine action 75 measured majores of 12. 12. 12. 12. 12. 12. 12. 12. 12. 12.
		measurement" and also does not regite the language "wherein the consing and the country of also does not regite the language "wherein the consing and the country of also does not regite the language "wherein the consing and the country of also does not regite the language "wherein the consing and the country of also does not regite the language "wherein the consing and the constitution of the constituti
		have a first side onnosite a second side and wherein the ionic and electronic conducting motorials and
		J. J

Presented Differences in the Claim Language	Reissue Claim	Unlike original patent claim 76, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "in which the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode."	Unlike, original patent claim 76, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."	Unlike original patent claim 77, presented reissue claim 85 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "in which the sensing electrode reacts with the gas in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 77, presented reissue claim 85 does not recite the language "quantitative measurement," and also does not recite the language "wherein the sensing, counter, first pumping, and electronic pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first other proposite second side, within each of the sensing
Original	Patent Claim	9.2		77

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
78	85	Unlike original patent claim 78, presented reissue claim 85 recites the language "a first protonic
		conductive electrolyte membrane in between and in contact with the sensing and counter electrodes,
		and having a thickness in the range of approximately 0.1 mm to 1 mm," recites the language "the
		sensing electrode and the counter electrode being on opposite sides of the first protonic conductive
		electrolyte membrane," and also recites the language "said sensing and counter electrodes each
-		having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to
		said electrical measurement means," and also recites the language "in which the sensing electrode
		and the counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte membrane," and also recites the language "in which the sensing electrode and the counter
		electrode are the only two electrodes in contact with the first protonic conductive electrolyte
		membrane," and also recites the language "in which the sensing electrode reacts with the gas in the
		absence of an applied voltage to the sensing electrode."
		Unlike, original patent claim 78, presented reissue claim 85 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the sensing, counter, and reference
		electrodes each have a first side opposite a second side, and wherein the ionic and electronic
		conducting materials are continuous from the first side to the opposite second side within each of the
		sensing, counter, and reference electrodes."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
	98	Unlike original patent claim 1, presented reissue claim 86 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the
		language "said electrical measurement means detects changes in said electrical characteristic in the
		absence of any biasing voltage."
		Unlike original patent claim 1, original reissue claim 86 does not recite the language "quantitative
		measurement."
2	98	Unlike original patent claim 2, presented reissue claim 86 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the
		language "said electrical measurement means detects changes in said electrical characteristic in the
		absence of any biasing voltage."
		Unlike original patent claim 2, presented reissue claim 86 does not recite the language "quantitative
		measurement," does not recite the language "means for applying DC power across the protonic
		conductive electrolyte membrane; an electrical connection between the sensing electrode, the counter
		electrode, and the means for applying DC power across the protonic conductive electrolyte
		membrane; and switch means for alternating an electrical connection between the sensing electrode
		and counter electrode from the electrical measurement means to the means for applying DC power
		across the protonic conductive electrolyte membrane; whereby the gas is transported away from the
		counter electrode when the means for applying DC power across the protonic conductive electrolyte
		membrane applies a DC power to the sensing and counter electrodes."

ed Differences in the Claim Language		Unlike original patent claim 3, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 3, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 4, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 4, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented	Reissue Claim	98		98	
Original	Patent Claim	က		4	

Differences in the Claim Language		Unlike original patent claim 5, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 5, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 6, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented	Reissue Claim	98		98	
Original	Patent Claim	5		9	

Differences in the Claim Language	Unlike original patent claim 7, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 7, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 8, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	98		98	
Original Patent Claim	7		∞	

Differences in the Claim Language	Unlike original patent claim 9, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 9, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 10, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 10, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	98		98	
Original Patent Claim	6		10	

Differences in the Claim Language	Unlike original patent claim 11, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 11, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 12, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	98		98	
Original Patent Claim			12	

Differences in the Claim Language	Unlike original patent claim 13, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 13, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 14, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 14, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
Presented Reissue Claim	98		98	
Original Patent Claim	13		14	

Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 15, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 16, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	98		98	
Original Patent Claim	15		16	

Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 17, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 18, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes."
Presented Reissue Claim	98		98	
Original Patent Claim	17		18	

Differences in the Claim Language	Unlike original patent claim 19, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 19, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 20, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise noble metals."
Presented Reissue Claim	98		98	
Original Patent Claim	19		20	

Differences in the Claim Language	Unlike original patent claim 21, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 21, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."	Unlike original patent claim 22, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 22, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	98		98	
Original Patent Claim	21		22	

Differences in the Claim Language	Unlike original patent claim 23, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 23, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 24, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	98		98	
Original Patent Claim	23		24	

Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 25, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 26, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim	98		98	
Original Patent Claim	. 25	-	26	

Presented Differences in the Claim Language Reissue Claim	Unlike original patent claim 27, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 27, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across said second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes."	Unlike original patent claim 28, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 28, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the second protonic conductive electrolyte
Pro Reiss			
Original Patent Claim	27	•	28

Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 29, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 30, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means in the absence of any biasing voltage." Unlike original patent claim 30, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "means for applying a DC pulse power source across the membrane; said sensing and counter electrodes having in electrical connection therebetween said means for applying a DC pulse power source across the membrane; and switch means for applying a DC pulse power source across the membrane; whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic when said switch means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter	electrode is placed when said switch means connects said means for applying a DC pulse power source across the membrane to the sensing and counter electrodes."
Presented Reissue Claim	98		98	
Original Patent Claim	29		30	

Differences in the Claim Language	Unlike original patent claim 31, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 31, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 32, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 32, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	98	98
Original Patent Claim	31	32

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
33	98	Unlike original patent claim 33, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
	ò	Unlike original patent claim 33, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."
34	98 .	Unlike original patent claim 34, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 34, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

Differences in the Claim Language	Unlike original patent claim 35, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 35, presented reissue claim 86 does not recite the language "quantitative".	membrane is a metal oxide protonic conductor electrolyte membrane." Unlike original patent claim 36, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 36, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	98	98
Original Patent Claim	35	36

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
37	98	Unlike original patent claim 37, presented reissue claim 86 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language a first protonic conductive electrolyte memorane in between and in contact with the sensing and counter electrodes and having a thickness in the range of annovimately 0.1 mm to 1
		mm," also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
		changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 37, presented reissue claim 86 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
		detect hydrogen."
38	98	Unlike original patent claim 38, presented reissue claim 86 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "a first protonic conductive electrolyte membrane in between and in contact with the
		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
		mm," also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
		measurement means," and also recites the language "said electrical measurement means detects
		changes in said electrical characteristic in the absence of any biasing voltage."
	-	
		Unlike original patent claim 38, presented reissue claim 86 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
		detect H ₂ S."

Meissue Claim 86 Unlike orig electrochen language " sensing an mm," also range of a measureme changes in Unlike orig measureme detect H ₂ O 86 Unlike orig electrochen language " sensing an mm," also range of a measureme changes in Unlike orig electrochen language " changes in Unlike orig measureme changes in	Original	Presented	Differences in the Claim Language
98	Patent Claim	Reissue Claim	
98	39	98	Unlike original patent claim 39, presented reissue claim 86 recites the language "a non-biased
98			electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
98			language "a first protonic conductive electrolyte membrane in between and in contact with the
98			sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
98			mm," also recites the language "said sensing and counter electrodes each having a diameter in the
98			range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
98			measurement means," and also recites the language "said electrical measurement means detects
98			changes in said electrical characteristic in the absence of any biasing voltage."
98			
98			Unlike original patent claim 39, presented reissue claim 86 does not recite the language "quantitative
98			measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
98			
electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also reclanguage "a first protonic conductive electrolyte membrane in between and in contact w sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm, also recites the language "said sensing and counter electrodes each having a diamete range of approximately 1 mm to 15 mm, and being electrically connected to said elemans changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 40, presented reissue claim 86 does not recite the language "quar measurement," and does not recite the language "wherein the electrochemical gas sensor is addetect NO _x ."	40	98	Unlike original patent claim 40, presented reissue claim 86 recites the language "a non-biased
language "a first protonic conductive electrolyte membrane in between and in contact w sensing and counter electrodes, and having a thickness in the range of approximately 0.1 m mm," also recites the language "said sensing and counter electrodes each having a diamete range of approximately 1 mm to 15 mm, and being electrically connected to said elemeasurement means," and also recites the language "said electrical measurement means changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 40, presented reissue claim 86 does not recite the language "quar measurement," and does not recite the language "wherein the electrochemical gas sensor is ad detect NO _x ."			electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm," also recites the language "said sensing and counter electrodes each having a diamete range of approximately 1 mm to 15 mm, and being electrically connected to said elemeasurement means," and also recites the language "said electrical measurement means changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 40, presented reissue claim 86 does not recite the language "quar measurement," and does not recite the language "wherein the electrochemical gas sensor is addetect NO _x ."			language "a first protonic conductive electrolyte membrane in between and in contact with the
mm," also recites the language "said sensing and counter electrodes each having a diameterange of approximately 1 mm to 15 mm, and being electrically connected to said elemeasurement means," and also recites the language "said electrical measurement means changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 40, presented reissue claim 86 does not recite the language "quar measurement," and does not recite the language "wherein the electrochemical gas sensor is addetect NO _x ."			sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
range of approximately 1 mm to 15 mm, and being electrically connected to said el measurement means," and also recites the language "said electrical measurement means changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 40, presented reissue claim 86 does not recite the language "quar measurement," and does not recite the language "wherein the electrochemical gas sensor is addetect NO _x ."			mm," also recites the language "said sensing and counter electrodes each having a diameter in the
measurement means," and also recites the language "said electrical measurement means changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 40, presented reissue claim 86 does not recite the language "quar measurement," and does not recite the language "wherein the electrochemical gas sensor is addetect NO _x ."			range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 40, presented reissue claim 86 does not recite the language "quar measurement," and does not recite the language "wherein the electrochemical gas sensor is addetect NO _x ."			measurement means," and also recites the language "said electrical measurement means detects
Unlike original patent claim 40, presented reissue claim 86 does not recite the language "quar measurement," and does not recite the language "wherein the electrochemical gas sensor is addetect NO _x ."			changes in said electrical characteristic in the absence of any biasing voltage."
Unlike original patent claim 40, presented reissue claim 86 does not recite the language "quar measurement," and does not recite the language "wherein the electrochemical gas sensor is addetect NO _x ."			
measurement," and does not recite the language "wherein the electrochemical gas sensor is addetect NO _x ."			Unlike original patent claim 40, presented reissue claim 86 does not recite the language "quantitative
detect NO _x ."			measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
			detect NO _x ."

ed Differences in the Claim Language	Maim	Unlike original patent claim 41, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 41, original reissue claim 86 does not recite the language "quantitative measurement."	Unlike original patent claim 42, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 42, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented	Reissue Claim	98		98	
Original	Patent Claim	. 41		42	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
43	98	Unlike original patent claim 43, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 43, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a first and a second electrical conductor materials."
44	98	Unlike original patent claim 44, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 44, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

Differences in the Claim Language	Unlike original patent claim 45, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 45, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 46, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 46, presented reissue claim 86 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."
Presented Reissue Claim	98		98
Original Patent Claim	45		46

Differences in the Claim Language	Unlike original patent claim 47, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 47, presented reissue claim 86 does not recite the language "a second protonic conductive electrolyte membrane; first and second protous mixed ionic-electronic conductive pump electrodes, each having both an electronic conductive material and an ionic conductive pump electrodes, each having both an electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to a chamber sealed off from the ambient atmosphere; said second porous pump electrode being separated from said counter electrode by a perforated support structure composed of an electrical conducting material, both said second porous pump electrode and said counter electrode being in contact with said sensing electrode and perforated support structure; means for electrical measurement in electrical contact with said sensing electrode and perforated support structure; whereby the gas is transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said electrical measurement means detects changes in said electrical characteristic.
Presented Reissue Claim	98	
Original Patent Claim	47	

Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 48, presented reissue claim 86 does not recite the language "quantitative measurement."	Unlike original patent claim 49, presented reissue claim 86 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 49, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	98		98	
Original Patent Claim	48		49	

Differences in the Claim Language	Unlike original patent claim 50, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 50, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 51, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 51, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	98		98
Original Patent Claim	50		

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
52	98	Unlike original patent claim 52, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 52, presented reissue claim 86 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black and the other of the first
		and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
53	98	Unlike original patent claim 53, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm², also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 53, presented reissue claim 86 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."

nted Differences in the Claim Language	Claim	Unlike original patent claim 54, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 54, presented reissue claim 86 does not recite the language "quantitative	measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."	Unlike original patent claim 55, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 55, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented	Reissue Claim	98		
Original	Patent Claim	54		52

M Reissue Claim 86 Unlike orige electrochen language "sensing and mm", also range of a measureme changes in measureme detect NO _x 86 Unlike orige electrochen language "sensing and mm", also range of a measureme changes in changes in Unlike orige measureme changes in Unlike orige measureme changes in Unlike origen detect H ₂ O	Original	Presented	Differences in the Claim Language
98	Patent Claim	Reissue Claim	
98	99	98	Unlike original patent claim 56, presented reissue claim 86 recites the language a non-biased
98			electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
98			language "a first protonic conductive electrolyte membrane in between and in contact with the
98			sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
98			mm", also recites the language "said sensing and counter electrodes each having a diameter in the
98			range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
			measurement means," and also recites the language "said electrical measurement means detects
98			
98			
98			Unlike original patent claim 56, presented reissue claim 86 does not recite the language "quantitative"
98			measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
98			detect NO _x ."
electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also language "a first protonic conductive electrolyte membrane in between and in conta sensing and counter electrodes, and having a thickness in the range of approximately 0 mm", also recites the language "said sensing and counter electrodes each having a diar range of approximately 1 mm to 15 mm, and being electrically connected to sain measurement means," and also recites the language "said electrical measurement me changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 57, presented reissue claim 86 does not recite the language "measurement," and does not recite the language "wherein the electrochemical gas sensor i detect H ₂ O vapor."	57	98	Unlike original patent claim 57, presented reissue claim 86 recites the language a non-biased
language "a first protonic conductive electrolyte membrane in between and in conta sensing and counter electrodes, and having a thickness in the range of approximately 0 mm", also recites the language "said sensing and counter electrodes each having a diar range of approximately 1 mm to 15 mm, and being electrically connected to sain measurement means," and also recites the language "said electrical measurement me changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 57, presented reissue claim 86 does not recite the language "measurement," and does not recite the language "wherein the electrochemical gas sensor i detect H ₂ O vapor."			electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
	· · · ·		language "a first protonic conductive electrolyte membrane in between and in contact with the
			sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
			mm", also recites the language "said sensing and counter electrodes each having a diameter in the
measurement means," and also recites the language "said electrical measurement me changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 57, presented reissue claim 86 does not recite the language "measurement," and does not recite the language "wherein the electrochemical gas sensor i detect H ₂ O vapor."		-	range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 57, presented reissue claim 86 does not recite the language "measurement," and does not recite the language "wherein the electrochemical gas sensor i detect H ₂ O vapor."			measurement means," and also recites the language "said electrical measurement means detects
Unlike original patent claim 57, presented reissue claim 86 does not recite the language "measurement," and does not recite the language "wherein the electrochemical gas sensor i detect H ₂ O vapor."			changes in said electrical characteristic in the absence of any biasing voltage."
Unlike original patent claim 57, presented reissue claim 86 does not recite the language "wherein the electrochemical gas sensor i detect H ₂ O vapor."			
measurement," and does not recite the language "wherein the electrochemical gas sensor is detect H ₂ O vapor."			Unlike original patent claim 57, presented reissue claim 86 does not recite the language "quantitative
detect H ₂ O vapor."			measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
			detect H ₂ O vapor."

ted Claim	Unlike original patent claim 58, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 58, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H.S."	Unlike original patent claim 59, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 59, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "a protonic conductive electrolyte membrane, having top and bottom sides, said top side of said protonic conductive membrane being in contact with the sensing electrode; the bottom side of said protonic conductive membrane being in contact with the sensing electrode; means for electrical measurement in electrical contact between the sensing electrode and said reference electrode; whereby the gas is transported away from the reference electrode when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane; and whereby, in a positive ambient applier a DC power across said protonic electrolyte membrane.
Presented Reissue Claim	98	98
Original Patent Claim	58	59

Patent Claim Reissue Claim 60 86	Unlike original patent claim 60, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the
	Unlike original patent claim 60, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the
	language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes and having a thickness in the range of approximately 0.1 mm to 1 mm".
	sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the
	range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
	measurement means," and also recites the language "said electrical measurement means detects
	changes in said electrical characteristic in the absence of any biasing voltage."
	Unlike original patent claim 60, presented reissue claim 86 does not recite the language "quantitative
	measurement," and does not recite the language "wherein said sensing, count and reference
	electrodes comprise carbon."
	Unlike original patent claim 61, presented reissue claim 86 recites the language a non-biased
	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
	language "a first protonic conductive electrolyte membrane in between and in contact with the
	sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
	mm", also recites the language "said sensing and counter electrodes each having a diameter in the
	range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
	measurement means," and also recites the language "said electrical measurement means detects
	changes in said electrical characteristic in the absence of any biasing voltage."
	Unlike original patent claim 61, presented reissue claim 86 does not recite the language "quantitative
	measurement," and does not recite the language "wherein said sensing, count and reference
	electrodes comprise noble metals."

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
	98	Unlike original patent claim 62, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 62, presented reissue claim 86 does not recite the language "quantitative
63	98	measurement," and does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides." Unlike original patent claim 63, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 63, presented reissue claim 86 does not recite the language "wherein the protonic conductive electrolyte measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

ted Differences in the Claim Language	Unlike original patent claim 64, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 64, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 65, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 65, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	98	ī	98
Original Patent Claim	64		9

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
99	98	Unlike original patent claim 66, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 66, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."
29	98	Unlike original patent claim 67, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 67, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."

Original	. Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
89	98	Unlike original patent claim 68, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 68, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
69	98	Unlike original patent claim 69, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
3.7		Unlike original patent claim 69, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

Original	Presented Reissue Claim	Differences in the Claim Language
70	98	Unlike original patent claim 70, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 70, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
71	98	Unlike original patent claim 71, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 71, presented reissue claim 86 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting
		materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
72	98	Unlike original patent claim 72, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
		mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical
		measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 72, presented reissue claim 86 does not recite the language "quantitative"
		sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a
		side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
73	98	Unlike original patent claim 73, presented reissue claim 86 recites the language a non-biased
		language "a first protonic conductive electrolyte membrane in between and in contact with the
· · · · · ·		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
		mm", also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects
		changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 73, presented reissue claim 86 does not recite the language "quantitative"
		measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black and the other of the first
		and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."

1 Differences in the Claim Language	Unlike original patent claim 76, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 76, presented reissue claim 86 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."	Unlike original patent claim 77, presented reissue claim 86 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 77, presented reissue claim 86 does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second side to the opposite second side within each of the sensing, counter, first pumping, and second	ansumaine of option of one
Presented Reissue Claim	98		98	
Original Patent Claim	76		77	

Differences in the Claim Language		Unlike original patent claim 78, presented reissue claim 86 recites the language a non-biased	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the	sanguage a mist protonic conductive electrolyte memorane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1	mm", also recites the language "said sensing and counter electrodes each having a diameter in the	range of approximately 1 mm to 15 mm, and being electrically connected to said electrical	measurement means," and also recites the language "said electrical measurement means detects	changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 78, presented reissue claim 86 does not recite the language "wherein the	sensing, counter, and reference electrodes each have a first side opposite a second side, and wherein	the ionic and electronic conducting materials are continuous from the first side to the opposite second	side within each of the sensing, counter, and reference electrodes."
Presented	Reissue Claim	98										
Original	Patent Claim	78										

1 Differences in the Claim Language		Unlike original patent claim 1, original reissue claim 87 does not recite the language "quantitative measurement."	Unlike original patent claim 2, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 2, presented reissue claim 87 does not recite the language "quantitative measurement," does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical connection between the sensing electrode, the counter electrode, and the means for applying DC power across the protonic conductive electrolyte membrane; and switch means for alternating an electrical connection between the sensing electrode and counter electrode from the electrical measurement means to the means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC power to the sensing and counter electrodes."
Presented Reissue Claim	87	·	87	
Original Patent Claim	1	<u>.</u>	2	

Differences in the Claim Language	Unlike original patent claim 3, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 3, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise carbon."	Unlike original patent claim 4, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 4, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise noble metals."
Presented Reissue Claim	<i>L</i> 8		87	
Original Patent Claim	E		4	

Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 5, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 6, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	87	87
Original Patent Claim	\$	9

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
. 7	87	Unlike original patent claim 7, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode are the only two electrodes in contact with
		the first protonic conductive electrolyte membrane," and also recites the language "said electrical
		measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 7, presented reissue claim 87 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the protonic conductive electrolyte
		membrane is a metal oxide protonic conductor electrolyte membrane."
8	87	Unlike original patent claim 8, presented reissue claim 87 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode are the only two electrodes in contact with
		the first protonic conductive electrolyte membrane," and also recites the language "said electrical
		measurement means detects changes in said electrical characteristic in the absence of any biasing
		voltage."
		Unlike original patent claim 8, presented reissue claim 87 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
		detect CO."

Differences in the Claim Language	Unlike original patent claim 9, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 9, presented reissue claim 87 does not recite the language "quantitative	measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO_{κ} ."	Unlike original patent claim 10, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 10, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	87		87	
Original Patent Claim	6		10	

Differences in the Claim Language	Unlike original patent claim 11, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 11, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 12, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 12, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	84		84	
Original Patent Claim	11		12	

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
13	87	Unlike original patent claim 13, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 13, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
41		Unlike original patent claim 14, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 14, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."

Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 15, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 16, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	87		87	
Original Patent Claim	15		16	

Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 17, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 18, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane applies a DC power to the first and second pump electrodes."
Presented Designs Claim	87		87	
Original Detect Claim	17		18	

Original Patent Claim 19 20	Presented Reissue Claim 87 87	Unlike original patent claim 19, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 19, presented reissue claim 87 does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon." Unlike original patent claim 20, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrody membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 20, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conductive measurement," and does not recite the language "wherein the electronic and ionic conductive measurement."
		materials of the first and second pumping electrodes comprise noble metals."

Original Patent Claim	Presented Reissure Claim	Differences in the Claim Language
21	87	Unlike original patent claim 21, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 21, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise conductive metal oxides."
22		Unlike original patent claim 22, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
	*	Unlike original patent claim 22, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the first and second pumping electrodes have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a thickness of about 0.17 mm."

Differences in the Claim Language	Unlike original patent claim 23, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 23, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said first and second pumping electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 24, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 24, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	87		87	
Original Patent Claim	23		24	

Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 25, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 26, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim			87	
Original Patent Claim	25	·	26	-

Differences in the Claim Language	Unlike original patent claim 27, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 27, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane; said first and second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes."	Unlike original patent claim 28, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage." Unlike original patent claim 28, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	87	·	87
Original Patent Claim	27		28

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
29	87	
		gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing
-,		electione and the counter electione are the only two electrones in contact with the first protonic
		conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 29, presented reissue claim 87 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the second protonic conductive electrolyte
		membrane is a metal oxide protonic conductor electrolyte membrane.
30	/8	
		_
		conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and
		having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and
		counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being
		electrically connected to said electrical measurement means," also recites the language "the sensing
		electrode and the counter electrode are the only two electrodes in contact with the first protonic
		conductive electrolyte membrane," and also recites the language "said electrical measurement means
		detects changes in said electrical characteristic in the absence of any biasing voltage."
		detects changes in said electrical changeteristic in the absence of any brashing voltage.
~~~		Unlike original patent claim 30, presented reissue claim 87 does not recite the language "quantitative
		measurement," and does not recite the language "means for applying a DC pulse power source across the
		membrane; said sensing and counter electrodes having in electrical connection therebetween said means for
		applying DC pulse power across the membrane; and switch means for alternating the connection between the
		sensing and counter electrodes from the electrical measurement means to the means for applying a DC pulse
	<b></b>	power source across the membrane; whereby, in a positive ambient concentration of said gas, said electrical
		measurement means detects changes in said electrical characteristic when said switch means connects said
		electrical measurement means to the sensing and counter electrodes; and whereby said means for applying a
	-	DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter
	····	electrode is placed when said switch means connects said means for applying a DC pulse power source across
		the membrane to the sensing and counter electrodes."

Original	Presented	Differences in the Claim Language
31	87	Unlike original patent claim 31, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 31, presented reissue claim 87 does not recite the language "quantitative
		measurement," and does not recite the language "wherein said sensing and counter electrodes comprise carbon."
32	87	Unlike original patent claim 32, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 32, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise noble metals."

ed Differences in the Claim Language	Unlike original patent claim 35, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 35, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	
Presented Reissue Claim	87		87
Original Patent Claim	35		36

Differences in the Claim Language	Unlike original patent claim 37, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 37, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."	Unlike original patent claim 38, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 38, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
Presented Reissue Claim	87		8.7
Original Patent Claim	37		38

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
39	87	Unlike original patent claim 39, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 39, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
40	87	Unlike original patent claim 40, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "said electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 40, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
41	87	Unlike original patent claim 41, presented reissue claim 87 recites the language "a non-biased
		language "the sensing electrode and the counter electrode are the only two electrodes in contact with
		the first protonic conductive electrolyte membrane," and also recites the language "said electrical
		measurement means detects changes in said electrical characteristic in the absence of any biasing
		VOItage.
		Unlike original patent claim 41, original reissue claim 87 does not recite the language "quantitative measurement."
42	87	Unlike original patent claim 42, presented reissue claim 87 recites the language "a non-biased
		electrochemical gas sensor for incasurement of a gas in an ambient atmosphere," also recites the
		tanguage the sensing electrous and the country of also recites the language "said electrical"
		measurement means detects changes in said electrical characteristic in the absence of any biasing
		voltage."
		Unlike original patent claim 42, presented reissue claim 87 does not recite the language "quantitative"
	,	measurement," and does not recite the language "wherein the sensing and counter electrodes have a
		diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about
		0.17 mm."

Differences in the Claim Language	Unlike original patent claim 43, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 43, presented reissue claim 87 does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor materials."	Unlike original patent claim 44, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 44, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	8.4	87
Original Patent Claim	43	44

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
45	. 87	Unlike original patent claim 45, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
	·	Unlike original patent claim 45, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
	87	Unlike original patent claim 46, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 46, presented reissue claim 87 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."

Differences in the Claim Language	Unlike original patent claim 47, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 47, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "a second protonic conductive electrolyte membrane; first and second porrous mixed ionic-electronic conductive pump electrodes, each having both an electronic sparate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to a chamber sealed off from the ambient atmosphere; said second porous pump electrode being separated from said counter electrode by a perforated support structure composed of an electrical conducting material, both said second porous pump electrode and said counter electrode being in contact with said sensing electrode and perforated support structure; means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said sensing electrode and perforated support structure; whereby the gas is transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane applies a DC power across said second protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.
Presented Reissue Claim	87	
Original Patent Claim	47	

Differences in the Claim Language	Unlike original patent claim 48, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 48, presented reissue claim 87 does not recite the language "quantitative measurement."	Unlike original patent claim 49, presented reissue claim 87 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 49, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."
Presented Reissue Claim	87	
Original Patent Claim	48	

Original	Presented	Differences in the Claim Language
Patent Claim	Keissue Claim	
	<i>L</i> 8	Unlike original patent claim 52, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 52, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
53	87	Unlike original patent claim 53, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 53, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."

ed Differences in the Claim Language	Unlike original patent claim 54, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 54, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to defend CO."	Unlike original patent claim 55, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 55, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	84	87
Original Patent Claim		55

e Claim	Unlike original patent claim 56, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 56, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 57, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 57, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented Reissue Claim	87		8.4
Original Patent Claim	96		57

Differences in the Claim Language	Unlike original patent claim 58, presented reissue claim 87 recites the language "a first protonic conductive electrolyte measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 58, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."  Unlike original patent claim 59, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes and having a diameter in the range of approximately 0.1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means, "and also recites the language "said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 59, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "a protonic conductive electrolyte membrane, having top and bottom sides, said top side of said protonic conductive membrane being in contact with the sensing electrode and the reference electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode and said reference electrode; whereby in electrical contact between the sensing electrode and said reference electrode; and protonic electrolyte membrane in electrical contact between the means for applying a DC power across said protonic electrolyte membrane and whereby in a nositive ambrane electrody and serioss said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane applies a pocument approtence electrody whereby	concentration of said gas, said electrical measurement means detects changes in said electrical characteristic."
Presented Reisene Claim	87		
Original Patent Claim	58	59	

Differences in the Claim Language	Unlike original patent claim 60, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 60, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing, count and reference	electrodes comprise carbon."  Unlike original patent claim 61, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm; also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 61, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing, count and reference electrodes comprise noble metals."
Presented Reissue Claim	<i>L</i> 8	87
Original Patent Claim	09	61

ted Differences in the Claim Language	Unlike original patent claim 62, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 62, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 63, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 63, presented reissue claim 87 does not recite the language "quantitative measurement" and does not recite the language "wherein the protonic conductive electrolyte
Presented Peisone Claim	87		
Original Potent Claim	62	*	63

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
40	<b>∞</b>	Unlike original patent claim 64, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 64, presented reissue claim 87 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."
65	87	Unlike original patent claim 65, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "said electrodes in contact with the first protonic conductive electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrode and the counter electrode are the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 65, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."

Differences in the Claim Language	Unlike original patent claim 66, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 66, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 67, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 67, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	87		87
Original Patent Claim	. 99		67

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
89	87	Unlike original patent claim 68, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the
		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the
		range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are
		the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical
		characteristic in the absence of any blasing voltage.
		Unlike original patent claim 68, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
69	87	Unlike original patent claim 69, presented reissue claim 87 recites the language a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "a first protonic conductive electrolyte membrane in between and in contact with the
		sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1
		mm", also recites the language "said sensing and counter electrodes each having a diameter in the
		measurement means," also recites the language "the sensing electrode and the counter electrode are
		the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also
		recites the language "said electrical measurement means detects changes in said electrical
		characteristic in the absence of any biasing voltage."
		Unlike original patent claim 69, presented reissue claim 87 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

Differences in the Claim Language		Unlike original patent claim 70, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 70, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 71, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt%	of a proton conductor material and 50-90 wt% of a first and second electrical conductor materials."
Presented	Reissue Claim			8.7	
Original	Patent Claim	70		71	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
72	87	Unlike original patent claim 72, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 72, presented reissue claim 87 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
73		Unlike original patent claim 73, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "said sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 73, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
74	87	Unlike original patent claim 74, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 74, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the counter and reference electrodes is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter and reference electrodes is 1-50 wt% of Ru oxide."
75	87	Unlike original patent claim 75, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "said sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 75, presented reissue claim 87 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."

Differences in the Claim Language	Unlike original patent claim 78, presented reissue claim 87 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 78, presented reissue claim 87 does not recite the language "wherein the sensing, counter, and reference electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, and reference electrodes."
Presented Reissue Claim		
Original Patent Claim	78	

Differences in the Claim Language	Unlike original patent claim 1, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 1, original reissue claim 88 does not recite the language "quantitative measurement."	Unlike original patent claim 2, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 2, presented reissue claim 88 does not recite the language "quantitative measurement," does not recite the language "means for applying DC power across the protonic conductive electrolyte membrane; an electrical connection between the sensing electrode membrane; and switch means for applying DC power across the protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the means for applying DC power across the protonic conductive electrolyte membrane applies a DC nower to the sensing and counter electrodes."
Presented Reissue Claim	88	
Original Patent Claim	-	2

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
3	88	Unlike original patent claim 3, presented reissue claim 88 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode," and also recites the language "said electrical measurement means detects changes
		in said electrical characteristic in the absence of any biasing voltage."
	-	Unlike original patent claim 3, presented reissue claim 88 does not recite the language "quantitative"
		measurement," and does not recite the language "wherein said sensing and counter electrodes
		Comprise Caroon.
4	88	Unlike original patent claim 4, presented reissue claim 88 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
	•	language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode," and also recites the language "said electrical measurement means detects changes
		in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 4, presented reissue claim 88 does not recite the language "quantitative
		measurement," and does not recite the language "wherein said sensing and counter electrodes
		comprise noble metals."

Differences in the Claim Language	Unlike original patent claim 5, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 5, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise conductive metal oxides."	Unlike original patent claim 6, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 6, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	88	88
Original Patent Claim	\$	9

ed Differences in the Claim Language	Unlike original patent claim 7, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 7, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 8, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."
Presented Reissue Claim	88		88	
Original Patent Claim	7		∞	

Original Patent Claim	Presented Reissue Claim	Differences in the Claim Language
6	88	Unlike original patent claim 9, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 9, presented reissue claim 88 does not recite the language "quantitative
	-	measurement, and does not recite the language wherein the electrochemical gas sensor is adapted to detect NO _x ."
10	88	Unlike original patent claim 10, presented reissue claim 88 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes
		in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 10 presented reissue claim 88 does not recite the language "anantitative"
		measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to
		detect hydrogen."

Original 11 12	Presented Reissue Claim 88 88	Unlike original patent claim 11, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode and the sony biasing voltage."  Unlike original patent claim 11, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 12, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
13	88	Unlike original patent claim 13, presented reissue claim 88 recites the language "a non-biased
	<u>-</u>	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
	_	sensing electrode," and also recites the language "said electrical measurement means detects changes
		in said electrical characteristic in the absence of any biasing voltage."
	-	
		Unlike original patent claim 13, presented reissue claim 88 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the sensing and counter electrodes have a
		diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about
	·	0.17 mm."
14	88	Unlike original patent claim 14, presented reissue claim 88 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode," and also recites the language "said electrical measurement means detects changes
		in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 14, presented reissue claim 88 does not recite the language "quantitative
-		measurement," and does not recite the language "wherein the electronic and ionic conducting
_		materials of said sensing and counter electrodes are a proton-electron mixed conductive material
	-	having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical
		conductor materials."

Differences in the Claim Language	Unlike original patent claim 15, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 15, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 16, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 16, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	88		88 8	
Original Patent Claim	15		16	

1 Differences in the Claim Language	Unlike original patent claim 17, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 17, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."	Unlike original patent claim 18, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 18, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor further comprises: first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conductive material, each of said first and second pump electrodes being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said protonic conductive electrolyte membrane; means for applying a DC power across the membrane; said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the membrane; whereby the gas is transported away from the counter electrode when said means for
Presented Reissue Claim	88		88	
Original Patent Claim	17		18	

Differences in the Claim Language		Unlike original patent claim 19, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 19, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of the first and second pumping electrodes comprise carbon."	Unlike original patent claim 20, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 20, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting	materials of the first and second pumping electrodes comprise noble metals."
Presented	Reissue Claim	88		88	
Original	Patent Claim	19		20	

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
21	88	Unlike original patent claim 21, presented reissue claim 88 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode," and also recites the language "said electrical measurement means detects changes
		in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 21, presented reissue claim 88 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the electronic and ionic conducting
		materials of the first and second pumping electrodes comprise conductive metal oxides."
22	88	Unlike original patent claim 22, presented reissue claim 88 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode," and also recites the language "said electrical measurement means detects changes
		in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 22, presented reissue claim 88 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the first and second pumping electrodes
		have a diameter of about 10 mm, and the first protonic conductive electrolyte membrane has a
		thickness of about 0.17 mm."

Original	Presented	Differences in the Claim Language
raient Ciaim	Keissue Ciaim	1 1. 1. 00 . 1 2
67	00	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		sensing electrode," and also recites the language "said electrical measurement means detects changes
		in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 23, presented reissue claim 88 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the electronic and ionic conducting
		materials of said first and second pumping electrodes are a proton-electron mixed conductive material
		having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
24	88	Unlike original patent claim 24, presented reissue claim 88 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode," and also recites the language "said electrical measurement means detects changes
	····	in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 24, presented reissue claim 88 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the proton conductor material for both the
		first and second pumping electrodes is a copolymer having a tetrafluorethylene backbone with a side
		chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid
		group."

Differences in the Claim Language	Unlike original patent claim 25, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 25, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the first pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the first pumping electrode is 10 to 50 wt% of platinum."	Unlike original patent claim 26, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 26, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the second pumping electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the second pumping electrode is 10 to 50 wt% of Ru oxide."
Presented Reissue Claim	88		88	
Original Patent Claim	25		26	

Differences in the Claim Language	Unlike original patent claim 27, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 27, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from said sensing and counter electrolyte membrane; means for applying a DC power across said second protonic electrolyte membrane; said first and second protonic electrolyte membrane; said first and second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when said means for applying DC power across said second protonic electrolyte membrane applies a DC power to the first and second pump electrodes."	Unlike original patent claim 28, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 28, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	88	· ·	88
Original Patent Claim	27	-	28

Differences in the Claim Language	Unlike original patent claim 29, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 29, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the second protonic conductive electrolyte membrane is a metal oxide protonic	Unlike original patent claim 30, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor former cround patent claim 30, presented reissue claim 80 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "said electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 30, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "means for applying a DC pulse power source across the membrane; said sensing and counter electrodes having in electrical connection between the sensing and counter electrodes from the electrical measurement means for applying a DC pulse power source across the membrane; whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic when said switch means for applying a DC pulse power source across the membrane source electrodes; and whereby said means for applying a DC pulse power source across the membrane moves CO away from a side of the gas sensor where the counter electrode is placed when said switch means connects said means connects said means connects said means for applying a DC pulse power source across the membrane to the sensing and counter electrodes."
Presented Daisona Claim	88	88
Original Patent Claim	29	.30

	Unlike original patent claim 31, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 31, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing and counter electrodes comprise carbon."	gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 32, presented reissue claim 88 does not recite the language "quantitative measurement" and does not recite the language "wherein said sensing and counter electrodes commise noble
Original	31		32

ed Differences in the Claim Language	Unlike original patent claim 35, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 35, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is a metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 36, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 36, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect
Presented Reissue Claim	&& &		88
Original Patent Claim	35		36

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
37	88	Unlike original patent claim 37, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 37, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
38	88	Unlike original patent claim 38, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 38, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."

Original Datent Claim	Presented Peissone Claim	Differences in the Claim Language
39	88	Unlike original patent claim 39, presented reissue claim 88recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 39, presented reissue claim 88does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
40	88	Unlike original patent claim 40, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 40, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."

Original Patent Claim 41	Presented Reissue Claim 88	Unlike original patent claim 41, presented reissue claim 88recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 41, original reissue claim 88does not recite the language "quantitative measurement."  Unlike original patent claim 42, presented reissue claim 88recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 42, presented reissue claim 88does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing and counter electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."

Differences in the Claim Language	Unlike original patent claim 43, presented reissue claim 88 recites the language "a first protonic conductive electrolyte measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 43, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."	Unlike original patent claim 44, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 44, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	88		88	
Original Patent Claim	43		44	

Differences in the Claim Language	Unlike original patent claim 45, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 45, presented reissue claim 88 does not recite the language "quantitative measurement" and does not recite the language "wherein one of the first and second electrical conductor	materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."  Unlike original patent claim 46, presented reissue claim 88 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 46, presented reissue claim 88 does not recite the language "wherein one of the first and second electrical conductor materials for the counter electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the counter electrode is 1-50 wt% of Ru oxide."
Presented Reissue Claim	88	88
Original Patent Claim	45	46

Original Patent Claim 47	Presented Reissue Claim 88	Unlike original patent claim 47, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 47, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "a second protonic conductive electrolyte membrane; first and second porous mixed ionic-electronic conductive pump electrodes, each having both an electronic conductive material and an ionic conducting material, each of said first and second pump electrodes being separate from
		said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane; said first porous pump electrode being exposed to a chamber sealed off from the ambient atmosphere; said second porous pump electrode being separated from said counter electrode by a perforated support structure composed of an electrical conducting material, both said second porous pump electrode and said counter electrode being in contact with said perforated support structure; means for electrical measurement in electrical contact with said sensing electrode and perforated support structure; means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said first pump electrode and said perforated support structure; whereby the gas is transported away from the counter electrode when the means for applying a DC power across said second protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
48	88	Unlike original patent claim 48, presented reissue claim 88 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode," and also recites the language "said electrical measurement means detects changes
		in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 48, presented reissue claim 88 does not recite the language "quantitative
		measurement."
49	88	Unlike original patent claim 49, presented reissue claim 88 recites the language "a non-biased
		electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode," and also recites the language "said electrical measurement means detects changes
		in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 49, presented reissue claim 88 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the sensing and electrodes have a diameter
		of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17
		mm."

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
20	<b>&amp;</b>	Unlike original patent claim 50, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 50, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing and counter electrodes are a proton-electron mixed conductive material having 10-50 wt% of a proton conductor material and 50-90 wt% of a first and a second electrical conductor materials."
51	88	Unlike original patent claim 51, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 51, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing and counter electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

Differences in the Claim Language	Unlike original patent claim 52, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 52, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."	Unlike original patent claim 53, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode reacts with the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 53, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein one of the first and second electrical conductor materials for the counter-reference electrode is 1-50 wt% of Ru oxide."
Presented Reissue Claim			88
Original Patent Claim	52		53

Differences in the Claim Language	Unlike original patent claim 54, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 54, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect CO."	Unlike original patent claim 55, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 55, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect hydrogen."
Presented Reissue Claim	88		88
Original Patent Claim	54		

Differences in the Claim Language	Unlike original patent claim 56, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode and the reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 56, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect NO _x ."	Unlike original patent claim 57, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 57, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ O vapor."
Presented	88		
Original	Fatent Claim 56		57

Original	Presented	Differences in the Claim Language
Patent Claim	Reissue Claim	
28	<b>88</b>	Unlike original patent claim 58, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 58, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."
	88	Unlike original patent claim 59, presented reissue claim 88 recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 0.1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode measurement means detects changes in said electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode, and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 59, presented reissue claim 88 does not recite the language "a protonic conductive membrane being in contact with the counter electrode and the reference electrode, the bottom side of said protonic conductive membrane being in contact with the sensing electrode; means for electrical measurement in electrical contact between the sensing electrode, means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode when the means for applying a DC power across said protonic electrolyte membrane applies a DC power across said protonic electrolyte membrane; and whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic."

Original Patent Claim 60 61	Presented Reissue Claim 88 88	Unlike original patent claim 60, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 60, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing, count and reference electrodes comprise carbon."  Unlike original patent claim 61, presented reissue claim 88 recites the language a non-biased electrodes comprise carbon."  Unlike original patent claim 61, presented reissue claim 88 recites the language a non-biased electrodes conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "the sensing electrode electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode in the absence of an applied voltage to the sensing electrode," and also recites the language
		"said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 61, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing, count and reference electrodes comprise noble metals."

Differences in the Claim Language	Unlike original patent claim 62, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 62, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein said sensing, counter and reference electrodes comprise conductive metal oxides."	Unlike original patent claim 63, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 63, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	88		88
Original Patent Claim	62		63

Differences in the Claim Language	Unlike original patent claim 64, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 64, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the protonic conductor electrolyte membrane."	Unlike original patent claim 65, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 65, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect
Presented Designation	88		88
Original	64		

Differences in the Claim Language	Unlike original patent claim 68, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 68, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect H ₂ S."	Unlike original patent claim 69, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm," also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 69, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electrochemical gas sensor is adapted to detect the language."
Presented	88 88		<b>8</b>	
Original	68 68		69	

Differences in the Claim Language	Unlike original patent claim 70, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 70, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the sensing, counter and reference electrodes have a diameter of about 10 mm, and the protonic conductive electrolyte membrane has a thickness of about 0.17 mm."	Unlike original patent claim 71, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 1.5 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 71, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the electronic and ionic conducting materials of said sensing, counter and reference electrodes are a proton-electron mixed conductive material having 10-50 wt% of a great and second electrical conductor materials."
Presented Reissue Claim	88		88
Original Patent Claim	70		71

Differences in the Claim Language	Unlike original patent claim 72, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 72, presented reissue claim 88 does not recite the language "quantitative measurement," and does not recite the language "wherein the proton conductor material for both the sensing, counter and reference electrodes is a copolymer having a tetrafluorethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 73, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "s first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 73, presented reissue claim 88 does not recite the language "wherein one of the first and second electrical conductor materials for the sensing electrode is 50-99 wt% of carbon black, and the other of the first and second electrical conductor materials for the sensing electrode is 1-50 wt% of platinum."
Presented Reissue Claim	88		88
Original Patent Claim	72 ·		73

Differences in the Claim Language		Unlike original patent claim 76, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 76, presented reissue claim 88 does not recite the language "wherein the sensing and the counter electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing and counter electrodes."	Unlike original patent claim 77, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm", also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 77, presented reissue claim 88 does not recite the language "wherein the sensing, counter, first pumping, and second pumping electrodes each have a first side to the opposite as econd side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, first pumping, and second pumping, and second pumping and second pumping and second pumping electrodes."
Presented	Reissue Claim	88		88
Original	Patent Claim	76		77

Differences in the Claim Language	Unlike original patent claim 78, presented reissue claim 88 recites the language a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "a first protonic conductive electrolyte membrane in between and in contact with the sensing and counter electrodes, and having a thickness in the range of approximately 0.1 mm to 1 mm, also recites the language "said sensing and counter electrodes each having a diameter in the range of approximately 1 mm to 15 mm, and being electrically connected to said electrical measurement means," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 78, presented reissue claim 88 does not recite the language "wherein the sensing, counter, and reference electrodes each have a first side opposite a second side, and wherein the ionic and electronic conducting materials are continuous from the first side to the opposite second side within each of the sensing, counter, and reference electrodes."
Presented Reissue Claim	<b>8</b>	
Original Patent Claim	78	